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THE

Dental Summary

EDITED BY
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COLUMBUS, OHIO

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THE DENTAL SUMMARY

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REGULAR CONTRIBUTIONS

THE SHOULDER CROWN*

BY GEORGE S. HERSHEY, D.D.S., COLUMBUS, OHIO

DENTISTRY OWES ITS GROWTH and rapid development today to organization. From the country, city and county societies to the state, national and international societies, with their organized efforts to exchange ideas, we owe our present development.

Dentistry today may be compared to the printing press. It is not the idea of any one man, but the combined efforts of thousands. So, I say, we should be willing and glad to give or exchange any idea to our fellow practitioner, no matter how simple it may seem, be it in our office or society. It might be just the thought he has needed to help him on to some greater work.

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*Read before the Columbus Dental Society, Oct. 26, 1915.

We all do some one thing better than our neighbor, and it is this one thing in which we surpass that we should bring before our society. With such a procedure carried out, it is not hard to imagine what the outcome would be. It is the man who observes and retains these ideas for the time when they shall become useful that makes the up-to-the-minute and skillful dentist.

This brings to mind an instance which happened some time ago. I had been attending a great state dental meeting, and for three days I had seen new and wonderful things pertaining to dentistry. As I was leaving the hall the last day of the meeting, I asked myself the question: "Am I going to be able to keep up with dentistry, the pace it is going?" A few days after this I met a friend and asked him how he liked the meeting. His answer was, "Oh, I did not think much of it. The same old thing, nothing new." I asked him of a few things that had been of wonderful interest to me, and he said he had not noticed them. Now this man had spent at least one whole day at this meeting and he had not carried home with him one idea that would help him or his fellow beings. So it behooves us to observe and reflect, and to choose the good from the bad, and not to condemn a good thing because we cannot do it, the latter condition prevailing probably because we have not made the effort.

The object of our meetings, then, is to exchange ideas, and if tonight I can extend to even one member here an idea that will be helpful to him in any way, I will feel well repaid.

Before taking up the subject of this paper, which is the "Shoulder Crown," I thought a little history of crowns in general would be of interest to you, and when I say crowns, I must necessarily include bridges, as they are practically an assemblage of crowns.

About the year 500 B. C., the Egyptians ligated with gold wire teeth made of ivory, to the adjoining teeth which served as abutments.

In Rome, between the third and fourth centuries, there is a record of teeth being supported by strands of gold wire soldered together. About this same time was used a shell crown incisor for dummy purposes only, supported by bands fitted to the adjoining teeth. This crown resembles very much the gold incisor we see today.

Nothing of importance, it seems, transpired in crown and bridge work from this period to the sixteenth century. In the year 1593, a rumor spread throughout Germany that a golden tooth had erupted in the mouth of a child, age seven years, and to use the words of the historian, (Guerini) was designated as "the first large molar on the left of the lower jaw." In those days the marvelous and unlikely things were taken seriously, and on this golden tooth were written many learned pamphlets and dissertations. In 1595 a book was published by a professor of medicine on the golden tooth of this child. He maintained that the phenomenon was produced from the effect partly of natural and partly of supernatural causes, in relation with the constellation under which the child was born. On the day of its birth, December 22d, 1585, the sun was in conjunction with Saturn in the sign of Aries. In consequence of this circumstance the nutrition force had developed marvelously on account of the increase of heat and consequently, instead of osseous substance, golden matter had been secreted. He had no doubt but that this was a sign of the approach of the golden age, etc.

This golden tooth was the subject of discussion among the noted learned men of that day. The discussions on this tooth lasted for a long time. As late as one hundred years after, in the year 1695, a new dissertation appeared. There were a number of letters published bearing on this golden tooth and I know the translation of one will be interesting to you. It is in part as follows:

" 'The Golden Tooth', boy hailed from a village near Schwidnitz, in Silesia, and had been so trained by his swindling father that, when in any assembly of men, some very simple and illiterate persons desired to see the tooth and had paid the fee, for the rascals made great gains, he would open his mouth wide and allow himself to be touched. But if educated men and those who seemed likely to make more careful scrutiny and experiment on any point, presented themselves, he contorted his countenance, remained silent, and simulated a kind of madness, the idea being that he permitted himself to be examined at stated times only, when the conditions allowed. Now, the tooth was covered with a plate, lamina (or layer), skilfully wrought of the best gold, and the gold was let down so deep into the gum that the cheat was not observed. However, as the plate was sometimes rubbed with a touch-stone as a test and was daily worn down by chewing, the real tooth at last began to appear. Of this fact a certain nobleman got an inkling, came to the place pretty drunk, and demanded that the tooth should be shown him. When the young fellow, at his master's word, kept silent, the nobleman struck his dagger into the boy's mouth, wounding him so badly that the aid of a surgeon had to be called, and so the deception was fully exposed. * * * The author of the fraud was said to have taken refuge in flight, the boy to be in chains."

This is the history of the first shell gold crown and, although not used for the purpose that it is today, it must have resembled the present-day crown with its cusps and grooves, to have deceived the learned men so completely.

About the year 1735, Fauchard relates in his writings of the pivot tooth, the crown of which was usually the crown of a human tooth, anchored to the root by one or two wires. This was in case, however, only when the root canals were sufficiently decayed to admit the wire.

Mouton, in 1746, mentions the use of gold crowns to prevent, as he puts it, "the further deterioration of teeth, already much destroyed, and to preserve them some time longer." He enameled the anterior gold crown to give it the appearance of a natural tooth.

From this time on crowns have been a development. Several of them have had names. Younger, perhaps, emphasized the gold shell in the early seventies. As put on by him, it was driven up to or down to the bone—why, no one knows. There never was a reason. Then there has been the Richmond, the Logan, the Davis, the Goslee, and several others, named after the men who designed them.

Bridge work, as I have said before, is an assemblage of crowns, and it is like Topsy, "It never was born, it just growed."

No work ever undertaken by the dentist has been abused like crown and bridge work, and no work ever attempted by the dentist, under its indications, was fraught with so much good. It ought to go without saying than any crown, bridge or filling that impinges on the peridental membrane is an injury so great that the value of the restoration is outweighed by the harm it will do.

So many factors bear upon the construction of this work that they cannot be covered in a short paper. I will very briefly consider same. I said crowns and bridges are useful under their indications. What, then, are these indications? An honest and capable man will not crown a tooth if by any possible way he can, by the filling process, make the restoration acceptable. The proportion of cases where this latter method can be adopted has increased amazingly by the cast inlay. It used to be said that if half the natural crown had been lost by decay, a crown was indicated. Not so now. Yet the manner of the destructive process may be such that when less than half of the tooth is gone, should this be on the distal half, a crown restoration might be indicated. Indeed these indications are really a matter of individual skill, an inlay restoration always being indicated when sufficient tooth and root remain to anchor the inlay safely.

The most serious objection to crown and bridge work, then, is not that it does not restore occlusion and contact, for properly made it will. The indictment lays against the injury it may do ·the peridental membrane, that any lesions made may be a focus of infection and a sure incitement to pyorrhea. This being true, why abandon an idea, and use of an invaluable adjunct in tooth preservatives, because, forsooth, somebody fails to perform his whole duty? Had we better not improve our methods, be more honest, more thorough, comprehend the detail, and appreciate with greater delicacy the mutability of the dental ligament, and treat it right? Do this, and where crowns and bridges are really indicated they will prove of great benefit, and in places where nothing else will do at all.

To treat the peridental membrane right, we must make a crown that will not irritate it. Good practitioners today are trying to overcome this by making the ferrule of the shell crown shorter and fitting it with more accuracy. However, to obtain a well fitting shell crown at the gum margin, it is an absolute necessity that the crown of the tooth be ground a trifle smaller than the neck. To do this it is necessary, in almost all cases, to devitalize the pulp; and, ladies and gentlemen, when we devitalize the pulp of a tooth and attempt to fill the root canal perfectly, and they *must* be filled perfectly to insure a healthy tooth and body, we are up against a proposition that is not equalled in any branch of operative surgery. In a great many cases it is an impossibility even by our most skilled operators.

A good healthy vital pulp is the best root canal filling we ever will find, and it behooves us as dentists to preserve this pulp whenever possible.

The X-ray today shows us what great mistakes we have been making in the past, and we must overcome these mistakes by preventing the death of the pulp. To do this in crown work, we must make a crown that will not require enough destruction of tooth structure to endanger the life of the pulp.

As the years have rolled on, we have found that even the well fitted gold crown is an irritant to the gum tissue, caused by the necessary thickness of the gold under the free margin of the gum. To overcome this irritation, we must make a crown when possible that will not extend to the gum line, but if necessary, as in the case of a very short bite, or the dipping of a cavity below the gum margin, the crown must be so made that the line of irritation is eliminated.

An ideal crown, then, should embody the following points:

A minimum loss of tooth structure in preparation, thereby preserving the vital pulp.

The elimination of a line of irritation.

The carrying out of the anatomical form of the tooth.

Perfect articulation with the opposing teeth.

Perfect points of contact.

The above points, we think, are embodied in the Shoulder Crown, which I will endeavor to describe to you by the aid of the pictures thrown upon the screen.

Figure 1 is a picture of a tooth prepared for the reception of the shoulder crown. There probably is no operation in operative dentistry that requires more care and mechanical exactness than the grinding of this shoulder on the posterior tooth in the mouth. This preparation differs from the preparation for the telescope and jacket crowns in that it is not extended to the gum margin, and therefore, the gum line cannot be taken for a guide. However, the preparation for these three crowns is very similar, the shoulder crown probably being a development from the jacket crown, following the discovery of the casting process.

In preparing this shoulder on a tooth, the technique used differs, of course, with different operators. In my hands, the following seems to give the most accurate and speedy results:

Grind occlusal surface so that there will be room for well defined cusps and grooves With a very small carborundum disk, used in a right-angled hand piece, I make a groove on the buccal surface of the tooth, running mesio-distally, as indicated by the dark line on the first molar. (Fig. 1.) I aim to make this groove just the depth I eventually want the width of my shoulder. When I have run this groove the full length of the tooth, mesio-distally, I then take a bur and continue the groove on through to the lingual, both mesially and distally. The groove is then continued on the lingual surface with the disk, as it was on the buccal.

In many cases time can be saved by cutting grooves as indicated by the perpendicular lines, and chipping the enamel off with the chisel. The latter procedure, however, cannot always be depended upon, as some enamel will not chip. If it will not, the only course to pursue is to cut a groove at right angles with the one formerly made, starting, of course, on the occlusal surface, back from the marginal line, the width you want your shoulder, which should be the depth of the mesio-distal groove.

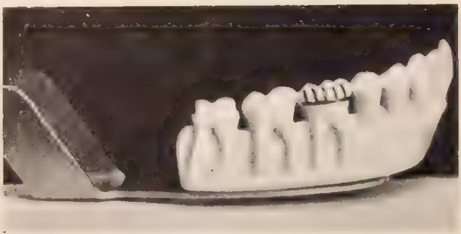
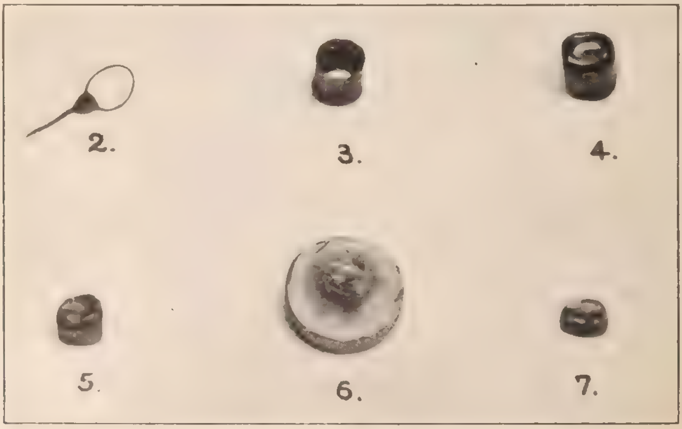


Fig. 1

After you have paralleled your lines, you have a preparation as seen here. (Fig. 1.) If there is a cavity in the tooth, dip down for your margin into solid tooth structure, fill up undercuts and major portion of the cavity with cement and prepare as just explained.

We next take a wire measurement of the tooth, at the point having the greatest circumference. This measurement is shown in Fig. 2.



Make a band from this measurement, of German silver or copper plate, about 36 gauge, just as you make a band for a shell crown, only have it plenty large so that it will go over the tooth freely. This is used for an impression tray, as seen in Fig. 3. Fill this tray with modeling compound, and get your impression, as you see it here in Fig. 4. Pack this with copper-amalgam and let it stand over night. Separate, and you should now have an exact duplicate of your prepared tooth, as shown in Fig. 5. Make an impression in moldine from this amalgam model, and pour up a Melotte-metal die. (Fig. 6.) Swage onto this thin platinum or gold foil, and finish burnishing on the amalgam model. You will find that the detail on the Melotte-metal die is not pronounced enough for this work. Be very *careful* of this amalgam model, as the sharp margins chip very easily, and it *must* be preserved for the finishing of the crown.

We now have this cap (Fig. 7). Into this flow bridge investment. If you use platinum, flow on this 22-k. gold. If pure gold, 22-k. solder. This is done to stiffen the cap so that it will not pull out of shape in the process of casting. Return this cap to the model, and see if it has been distorted by the soldering. If so, swage and burnish again.

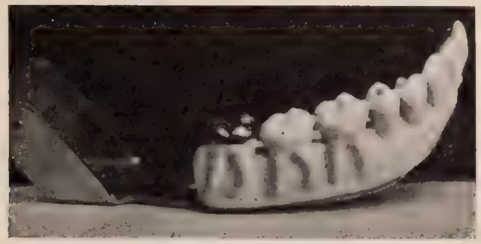


Fig. 8

Now it is ready to be tried on the tooth, in the mouth. If it fits perfectly, remove and paint the surface on which you are going to cast with a solution of boracic acid in alcohol. Hold it over the flame until it becomes a cherry red. Let cool without dipping in water. This is important, as it keeps the cap from oxidizing, and in casting there will be a perfect union.

The cap can now be returned to the tooth, the bite taken with the inlay wax, and carved and cast. After casting you will find that it will take a little effort to replace this on your amalgam model, due to the slight shrinkage of the gold in cooling.

When seated, polish on this model, ready for the mouth.

If detail is observed, this method of procedure will result in a perfect fitting shoulder crown, as shown in this picture. (Fig. 8.)

There is no doubt or question regarding the practicability of this crown. Anatomically and mechanically, it is the ideal.

Prophylaxis can be carried on about the tooth carrying a shoulder crown with the same results as the one next to it, with its perfect natural crown.

It is the crown the dentist is proud of, and one the patient will wear with comfort.

The shoulder crown is indicated more for the abutments of bridges and for splints in pyorrheal conditions.

Teeth in which the pulp must be devitalized, and in which the tooth structure has been lost to a great extent, can be built up by the inlay process, retention being secured by posts in canals, or pulp chamber.

I use this crown almost exclusively for splints in pyorrhea, as shown in the following pictures. Fig. 9 shows the preparation for the splint, and how necessary it is to parallel the lines. It must be remembered that these crowns fit perfectly, and when they are used for abutments, as well as splints, we must not take a chance on the finished piece going to place, if the lines are not paralleled. It will not, unless you grind the teeth, and then you lose the efficiency of the crown.

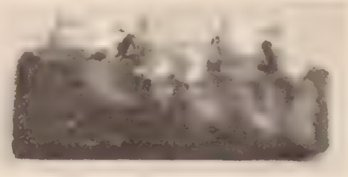


Fig. 9

The next picture (Fig. 10) shows the splint as it looks when set. With this splint there can be no masticatory force exerted at any one point more than another. The stress is distributed equally over all teeth connected.

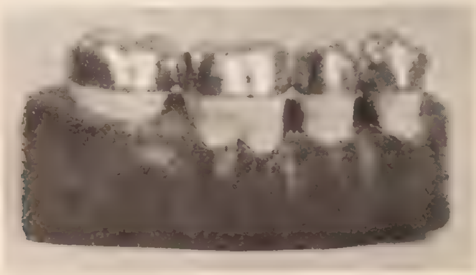


Fig. 10

It is my desire that we co-operate for the purpose of working out an easier and quicker method of making the shoulder crown. If some inventive genius will give us an attachment for the hand piece that will grind these shoulders, and a metallurgist give us a metal that will cast true to the mold, we will, in a very few years be able to say of the shell crown what we now say of the open-faced crown, that it is not practical, and has no place in dentistry.

508 Hartman Bldg.

A DRESSING FOR IMPRESSION BEFORE POURING UP WITH PLASTER OF PARIS.

BY W. T. DAVIS, WARSAW, ILL.

Dissolve base plate rubber in chloroform; apply by coating impression. Warm before separating by tapping it, only when a full upper.

GOLD INLAYS AS BRIDGE ABUTMENTS.

BY H. U. SHEPHERD, D.D.S., COLUMBIA, TENN.

I FIND THAT GOLD INLAYS are much better abutments for bridge cases than any kind of crown, where indicated, which I believe is more often than is generally used. Hence, being convinced of the sanitation and durability of this method and, too, realizing the great need of aseptic dentistry—especially in crown and bridge work—I am prompted to agitate a better and more practical method. I wish to make this paper as simple as possible; to do this, and to bring out points I am endeavoring to make, I give resume of the procedure from cavity preparation to finished bridge.

I prefer the use of cast gold inlays made of platinized gold or some alloy of gold. We use alloy of gold for the purpose of minimizing the pliability of the metal. The secret of success in the use of the inlay abutment is in its anchorage. I do not advocate post anchorage for inlay where post is used to enter nerve canal, because it weakens every feature of the abutment and in most instances the use of the post has been a failure in my hands. Enlarging root canals weakens the tooth. Casting to post weakens the inlay because it is rare if the gold fuses and adheres to the post. Often the post works loose regardless of kind of post material. The best possible anchorage is to dove-tail so as to accommodate anchorage on the occlusal surface. If you have an upper bicuspid disto-occlusal cavity, extend the cavity over the occlusal to mesio-occlusal pit, enlarging mesio-occlusal pit one and one-half or two millimeters in diameter, cutting slot from mesio-occlusal pit to distal part of cavity, slot a little less than mesio-occlusal pit. Mesio-occlusal pit anchorage must extend as far as possible in direction with long axis of tooth; this gives strength and anchorage to inlay sufficient to hold any number of dummies. Cavity should be slightly wider at occlusal surface than in floor of cavity. The difference should be hardly perceptible; I would say for sake of comparison, not more than one millimeter. The floor of cavity should be made a little deeper than floor margin of enamel at cervical, another very important point of anchorage. No small, weak pins are permissible here. This kind of inlay will not come out, nor will it work loose.

CAVITY PREPARATION

I wish to explain the preparation of cavities in a general way in bicuspids and molars, as we will deal more directly with this class of cavities as abutments for bridges. In general, we use extension for prevention, cutting all pits and fissures so as to prevent future decay. In bicuspids, extending cavity bucco-lingually and gingivally beneath the gum. If

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*Read before the Tennessee State Dental Association, 1915.

mesial cavity, to distal pit, which said pit must be enlarged just enough to make strong occlusal anchorage and not enough to materially weaken tooth, or if mesio-occlusal cavity, extend in every way to prevent future decay and not unnecessarily weaken tooth. All cavities must have their walls parallel, or I will say slightly wider bucco-lingually at occlusal than at cervical portion bucco-lingually. This has a tendency to make a snug fitting inlay, robbing contraction of its inevitable defects. Likewise, you would construct cavities in molars carrying out the same principles.

WAX MODEL

The wax should be pliable when warm and friable when cold. I find a vast difference in the different prepared wax manufactured for inlay purposes. I use and find Kerr's inlay wax to answer better than any other. After the cavity is properly prepared, size and general outline noted, I select a portion of wax much greater in size than the cavity; heat over flame, then shape one end sharp, cone-like, and heat again until wax is of a uniform softness, or rather to a pliable consistency, just a little stiff; then press it home with a great deal of force with finger, thereby well seating same in every part of cavity. Then I at once roughly trim excess and test the removal. If the wax seems to come without dragging, I again slightly warm over flame and replace in cavity and carefully adapt to all walls of cavity, then chill with cold water and trim to restore lost tooth structure as much as possible, restoring in detail all pits, grooves and fissures, etc., which is very important.

INVESTMENT COMPOUND

I have used Imperial to the very finest kind of investment compound materials; so far I do not note any difference in coarse or finely ground materials. My observation and experience teaches me that the amount of moisture to a given amount of investment material means more if properly mixed than any other feature of the making of a good, solid, hard investment. Possibly the most scientific method given us is by Doctor Taggart: A given quantity of water for a given quantity of investment compound. I mix all investment compound to a consistency as stiff as will pour from a plaster bowl. I had rather have it a little soft than stiff, because it will adapt itself better to inlay wax form.

DRYING AND CURING INVESTMENT

After you have run investment, set aside until thoroughly hard. This time is unlimited, but not necessary to wait more than 15 or 20 minutes. Then remove to near flame and gradually dry investment. When warmed up considerably, remove sprue pins and continue to warm up gradually until you can detect no steam escaping. At this stage we put directly under the flame and heat to an intense degree and hold until, when removed, you can see no trace of the carbon residue. We are now ready to cast inlay. The proper metal to use for inlay abutment should be least unpliable, 24-k. not indicated. 20-k. is permissible, or what is known as platinized gold is best. Melt your metal to almost white heat and cast at once. Gradually let cool. Never rush any of the details of the procedure if you want the best inlay possible. I want to say to every one, and stick to it, that you will not make any perfect inlays; although you should make all very nearly so.

Now we come to the construction of bridge. Having inlays made we place in cavities and see that we have the best possible fit. Supposing this case to be disto-occlusal cavity in upper first bicuspid to mesio-occlusal cavity in second molar, which makes a most desirable bridge. We first shape our cavities as if for a filling, except we must construct so each fill can be withdrawn from cavity as if but one fill, making each parallel with the other. We can prove this by using a small, stiff, metal wire cut to allow each end to exactly fit in cavities. Now, with wax form in place, heat ends of wire enough to engage each inlay. If wax forms can be withdrawn you can rest assured that you are safe in making the bridge. The next procedure is getting an impression with fills in place, then you can proceed as in ordinary crown bridge work, making the impression of plaster of Paris. Your fills rarely ever withdraw with impression, but you can construct inlay so there will be no trouble in placing same in imprints made in impression, and it may be necessary to remove impression as if removing according to procedure in orthodontic impression making. I never take impressions and use models at this stage of construction. In making bridges with inlay abutments, modeling compound is my hobby, and I use the mouth as a model. Reason for not using plaster of Paris is the expansion and contraction of the material; and the reason for using the modeling compound is that if properly made, it does neither expand nor contract. To be plain, I use the direct method from beginning to the end.

A proper way to construct this kind of bridge is after you have inlays constructed and in place, you take impressions of upper and lower teeth and make models and articulate same. Now select your dummies, gold or porcelain, as may be indicated, and articulate same as in ordinary way. Solder up all dummies together, shape and polish as if ready to seal in mouth. We now return dummies to place in mouth and see that they are all right in every particular. When making inlays leave a little spur on each inlay at or near the cervical margin. This is done to enable you to get correct articulation of dummies and to aid in getting perfect articulation. When taking modeling compound impression you would proceed in this way: By using a small quantity of modeling compound, soften by heat, pressing same between inlays under dummies, at the same time having patient close mouth in order that you may arrange the articulation of dummies. After this is done satisfactorily, harden modeling compound by cooling with very cold water. This enables you to get a modeling compound impression of the work as a whole. This impression should be made in a very shallow impression tray. Cool the impression, withdraw from the mouth, place inlays and dummies in imprints of impression and with sticky wax join inlays and dummies together. Invest in a good investment compound and solder as in other bridge work. To be more accurate, it is much better to solder one inlay at a time.

It is necessary to be painstaking and accurate in every step. When you do this kind of bridge work you will be surprised at your perfection, and at the same time find a most flattering chance to rob nature of her virtue as regards sanitation and estheticism.

DISCUSSION

Dr. R. D. Crutcher, Lewisburg: I feel that there are others here more able to discuss this paper than I am. While I do a great deal of cast work, I have made quite a number of bridges of this character, yet in the bridges of the character which Doctor Shepherd has outlined in his paper, I find there is considerable trouble usually in getting them to seat well (I speak of the ones that have the inlay attachment) because of contraction. This can be overcome to a very large extent by making each dummy separately and then soldering them together. I have never tried the plan that he suggests of uniting the work together, leaving one end not united, and carrying the work back to the mouth, and then uniting the other end of the work.

In doing bridge work of all kinds I make each piece separately and polish them before I attempt to place them in my work, and that saves me a great deal of work after it comes from the fire. I sometimes cast my dummies in one solid piece and then I polish them and transfer to the model on the articulator, where I solder them together in the articulator, saving investment of them and the loss of much time. I do this with my work where I use porcelain, the same as the other work, using detachable porcelain, and I usually get good results.

Dr. W. J. Morison, Nashville: I was very much interested in this paper because of the fact that I was in hopes that the essayist would bring out something that would assist me in the use of inlays. If we could just use inlays successfully in bridge work, it would save our patients a great deal of time, and we would be able to make a great deal more artistic piece of work.

I tried it when I first came out of college, by hammering cohesive gold; then I tried it when we burnished the gold in and made the inlay, and when we got to the cast inlays I tried it along that line, and I have had to do a great deal of that work over. Doctor, the pressure comes on the inlay and works the inlay out. It does not work the tooth. The tooth don't go with the inlay, like it does under the crown. The result is that you have that inlay being pushed backward and forward until in many, many cases I have had to go ahead and cut off my anchorage and crown the tooth, and put back the bridge work. That has been my experience. I have anchored them in all kinds of ways, anchored them down deep; I have followed his rules, and I have failed all along the line. As Doctor Bryan says, we learn from our failures more than we do from our successes. It is a beautiful thing to succeed. If this gentleman will show us where we can anchor an inlay so that we can hold a bridge, and hold it as well as a crown can hold it, it will render the profession a great service.

Doctor Shepherd (closing): Doctor Morison is an older man than I am, and I do not wish to say anything more on the subject. Of course, I realize it is a sanitary bridge, and it is all right, and you can put in one tooth and make it all right, substantial and strong enough. I have put them in for men with very strong jaws, 300 pound pressure, and if you fit them in there accurately they will stay. There is one thing about this bridge: you can clean the margins around. It is not down under the gum where you cannot get to it and brush it out with the tooth brush, and some day we will be making that kind instead of punching them in with a mallet. Inlays are all right.

MALPLACED AND IMPACTED THIRD MOLARS*

BY L. G. NOEL, M.D., D.D.S., NASHVILLE, TENN.

A TOOTH IS SAID to be malplaced when not in normal relation to surrounding parts; when out of position and not in correct occlusion with opposing teeth.

A tooth whose eruption at the proper time has been prevented by its malposition, lack of space, or any other cause, is called an "impacted," or "imprisoned" tooth.

The third molars are frequently imprisoned in this manner, and in obedience to the laws of nature seeking to obtain full development, although the space for such growth is insufficient, root growth is abnormal, and the hyperemia induced by pressure causes hypercementosis, productive of a series of neuroses, painful to say the least, and often of a very grave character.

Sometimes these imprisoned third molars produce a distinct cystic tumor in the bone that is probably the result of long-continued irritation. A number of causes have been mentioned for these malplaced teeth, such as the migration of the tooth germ as the result of the bony changes incident to the lengthening of the rami of the mandible, and the backward growth of the maxillæ; the original malposition of the tooth germ; the injudicious extraction of teeth; the operation of hereditary causes, etc.

It is the writer's belief that a large number of these cases are due to the inheritance of contracted jaws, with large teeth thus necessarily crowding out the last group of molars. Cases have been recorded where these teeth have developed far up on the condyle, nearly in the temporo-mandibular joint. Doctor Cryer reported such a case resulting in ankylosis. It will refresh your memory in regard to the very large number of these cases that have been reported and pictured in our literature, to look over the chapters on this subject in our latest text-books.

The upper third molar in its descent sometimes encounters the roots of the second molar, and may become united to it by hypercementosis, called concrescence. The writer had a case where this condition existed on both sides, and was revealed by the extraction of the roots of the second molars for a denture.

The roots of the upper third molars more frequently become entangled with the roots of the second molars than in the case of the second and third lower molars. This liability to union of the roots of the second and third molars should be remembered in the extraction of misplaced upper third molars, and they should be tested for individual motion before attempting to extract them. It often happens that these upper third molars are so deflected from their proper position that their occlusal surfaces look outward toward the cheek, becoming a source of irritation to the soft tissues of the cheek, and decaying early because of the difficulty in reaching them with the toothbrush for effective cleansing.

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*Read before the Tennessee State Dental Association, 1915.

The lower third molar more frequently tilts forward toward the second molar, and cases of malposition of this tooth show many different degrees of angularity, from the slightest tilting to the impacted tooth lying prone with its occlusal surface against the distal root of the second molar. The constant tendency to assume this angle causes a divergence of the roots of the second and third molars, and probably accounts for the rare occurrence of concrescence of these teeth in the mandible. A number of cases have been reported where lower third molars have developed in the bone with their occlusal surfaces in contact with the distal root of a second molar, causing its absorption by pressure, until the pulp of the second molar has been exposed and destroyed. The writer has seen several cases of this kind, two in which the third molar was partially erupted but tilted at an angle that caused the mesial cusp to rest upon the distal root of the second molar in such a way as to result in its absorption. In this event a series of disturbances are set up, and unless promptly treated must inevitably produce alveolar abscess, or something even more serious. These impacted third molars may, when not partially erupted, lie in the jaw for years without apparently causing any trouble. But on the contrary they may cause a series of psycoses of a more or less serious nature, ranging from slight manifestations of neurasthenia to a decided mania.

In 1909 Dr. Henry S. Upson, professor of neurology in the Western Reserve Medical School at Cleveland, Ohio, read a paper before the Northern Ohio Dental Association on "Nervousness and Insanity Caused by Painless Dental Disease," in which he reported numerous cases of melancholia, mania and dementia precox, cured by extracting malplaced and impacted wisdom teeth. In the beginning of this paper he says, "It has long been known that irregular teeth are common to the insane and among habitual criminals." This fact has been clearly established by Talbot in his studies of the causes of irregularity, and in his book on degeneracy.

Doctor Upson's cases are very instructive and should, we think, establish a new method of treatment in hospitals for the insane, and in sanitariums for nervous diseases. This new method should be based upon careful radiographic studies of the jaws of all these patients, and a systematic treatment of such abnormalities as may be thus revealed as far as such conditions may be corrected by operative or therapeutic measures. Such treatments should not be too conservative, but when it has been clearly established that psycoses of a grave character have been produced by diseased teeth, such teeth should be removed.

The writer recalls an experience in his early practice where a young boy of fourteen or fifteen with very crowded arches was threatened with prominent and tusk-like cuspids. The extraction of the four first bicuspids was advised, a practice that would now be condemned by all good orthodontists—perhaps by all good dentists. Shortly after the operation the father called to express his delight in the improvement he could see was following, and to report the disappearance of a most annoying case of St. Vitus dance that had been the cause of much anxiety. The chorea never returned, and a few years later I treated a younger brother in the same way for similar troubles, with like success.

We have much infective inflammation about third molars that are tilted at varying angles against the second molars. Many of these never come entirely through the gum, and the partial covering of gum gives lodgment to food which, undergoing fermentation, becomes a breeding ground for pyogenic organisms and abscess results. These abscesses sometimes cause death of the pulps in the teeth from thrombosis of the vessels in the apical space, and may cause extensive necrosis if neglected.

These imprisoned third molars that lie in a horizontal position are sometimes placed in such close relation to the mandibular nerves and blood-vessels that it is not surprising that they give rise to curious psycoses or painful neuralgias when hyperemia has produced considerable enlargement of their roots. Doctor Cryer shows some cases where such teeth have been found lying almost in the mandibular canal. The extraction of these teeth is always indicated. It is an end much to be desired, but is often very difficult surgery. Doctor Upson and some other recent writers speak of it as easy to do, but it should not be undertaken lightly, nor viewed like ordinary tooth extraction.

The operator should be provided with a Cryer surgical engine and outfit for this work, but many cases can be treated with the ordinary dental engine. Conductive anesthesia by the Fischer method with novocain will be found best for the majority of cases. The infiltration method with novocain and suprarenin will be found an excellent adjunct for preventing hemorrhage. The operator should be provided with thin wheels for cutting off cusps, and suitable burs for removing the overlying bone, the necessary bistouries, and *very important* will be found good retractors for holding the soft tissues back.

We cannot be too careful about the sterilization of all instruments.

The operator should be guided by carefully prepared radiographs, never working by guess.

It would be futile to attempt to outline a technic for this operation because of the very great variety of cases that present themselves. In the mandible these third molars can usually be removed by laying open the soft tissues to the bone on the outer and distal aspect of the tooth, retracting the fleshy parts after peeling back the periosteum, and sponging out the blood until a good view of the bone is obtained. Next bur away the bone on the distal and buccal aspect of the tooth until it is well released and then turn it outward with an elevator.

In some cases of curved and much exostosed roots it will be necessary to remove enough bone upon the lingual side to get a grasp upon the tooth with the forceps so as to dislodge it. As remarked above nearly every case presents some peculiar feature of its own that must be met, and no hard and fast rules can be laid down.

After the removal of the tooth the soft tissues may be returned to place and the wound washed with a mild solution of glycothymoline until hemorrhage has ceased, then if necessary the opening should be packed with sterilized gauze and dressed daily, syringing each time with a weak solution of glycothymoline until granulations have fairly commenced to form; then have the patient wash the mouth three times a day with normal salt solution.

ROOT CANAL FILLING*

BY DR. H. C. WERTS, BEAVER FALLS, PA.

Two methods of root canal filling will be described. The contents of the canals having been sterilized, the first and most important procedure is the preparation of the canal for the reception of the filling material. Between the pulp chamber and root canal in all normal roots will be found a slight constriction. To properly fill the canal this constriction must be removed. This is accomplished by the use of Gates-Glidden canal drills, Nos. 174, 175, 176 and 177; also Kerr or Downie universal broaches. If this constriction is not removed the gutta percha point on entering the canal rests on the shoulders of the constriction, being suspended in the canal.

First method, Doctor Callahan's method: Dissolve 12 gr. resin (violin bow) in two drams of chloroform. This preparation is carried to the orifice of the canal with the dressing pliers, and pumped to the apex followed by gutta percha points to fill the canal. This method I have found very successful in large canals. (Experimenting with glass tubes representing root canals.) In highly attenuated canals the points of the fine gutta percha cones become very soft from their contact with the chloroform and fold upon themselves or buckle and do not reach the apex of the root.

The second method, by Doctor Buckley: It has been found that air cannot be displaced by a solid or a semi-solid. It is therefore necessary to displace the air in a root canal with a liquid, using a square broach to pump the liquid to the apex, as a round tapering broach entering a canal of the same shape acts as a valve, preventing the air from escaping. The square broach comes in contact with the canal along its four angles, letting the air escape and the liquid takes its place. Eucalyptol compound is the liquid. This liquid is displaced by eucapercha compound, a semi-solid, followed by gutta percha points.

*Clinic Odontological Society, W. Pa., 1915.

CAST BASE DOWEL CROWNS VS. GROUND JOINT AND SHELL CROWNS*

BY J. A. GARDNER, D.D.S., MEMPHIS, TENN.

THE GREATEST BENEFIT to humanity will come through the thorough understanding and proper application of the principles of prevention of diseases, and I want to emphasize the fact that individual practitioners of any branch of medicine will progress in proportion to the extent to which they employ the principles of prevention. And especially is this applicable to the specialty of dentistry.

Those of the dental profession who have been seriously seeking after the truth, regardless of the penalty it may inflict, are aware of the fact that a large percentage of the systemic disturbances among their patients are directly due to negligence of the principles of prevention, or perhaps to their ignorance in the premises at the time.

From the study of mouth hygiene we find that the slightest deviation from the perfect mouth militates against immunity from disease. The slightest irregularity, malformation of a single tooth, malocclusion, the slightest break in the continuity of a tooth, deposits around the neck of a tooth, all invite disease to a greater or less degree, and in proportion to the degree of the imperfection.

And when we stop to think of what a healthy mouth means to a human being—health, comfort, efficiency and happiness—and then realize what diseased mouths mean to humanity, we begin to feel the grave responsibility incumbent upon the dental profession.

I, of course, appreciate the fact that the ideal thing to do is to begin with the babies and employ preventive measures which will preclude the necessity of a crown of any kind, and I believe the time is close at hand when most of our efforts will be directed toward preserving the temporary teeth. There are already dental pediatricians in the field, but at present we have much to do in the field of restoration.

I fear we do not at all times give the proper consideration to the character of the artificial restoration which we are about to employ in a mouth, from a standpoint of pathology growing out of improper contact, occlusion, and improper tooth form. We are loud in our denunciation of the dentist who ignores calcific deposits, malocclusion, malformation of the tooth, overhanging or imperfect margins in fillings, and improper contact or contour form. What we should strive to accomplish in an artificial crown is what we insist upon in the natural crown. We should not be satisfied with a less perfect margin in an artificial crown than in a filling or an inlay.

Therefore, I condemn the use of the ground joint crown under any and all circumstances, for I believe it an impossibility to approach perfection in the margin, to the degree possible in the cast joint crown.

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*Read before the Tennessee State Dental Association, 1915.

What would you think of a dentist who would (in the face of the advantages of today) employ ivory pegs, ground to fit a cavity, and cement them in, instead of using synthetic fillings or an inlay? And yet that operation would, in my opinion, be more feasible than the use of a ground joint crown.

We should also insist upon the same standard of perfection in the construction and application of an artificial crown as we do in an inlay or filling, as to contour, occlusion, contact and occlusal form. With a view to the prevention of disease, I contend that we should spare neither time nor expense in our efforts to approach perfection, or as near perfection as possible, for in proportion to the degree of perfection we attain in the construction and application of artificial crowns, are they useful. And in order to reach the above standard of perfection in artificial crowns, we must closely observe the following requirements: First, a perfect fit at the gingival; second, proper contact form and maintenance of the interproximal space; third, perfect occlusal form and proper contour.

The dentist has not yet been born who can comply with the first requirement in the application of a "ground joint crown" in the mouth, neither does that man live who can meet the requirement by employing a shell crown to anything like the degree of perfection as can be attained by the use of a "cast base crown." And, to my mind, there is no operation in the mouth which bears so definite a relation to health or disease as does this first requirement in the application of a crown.

If there is a duty incumbent upon a professional man, it is to employ every measure known to his profession to combat disease at any cost. One of the greatest reflections on the dental profession is the fact that there are dentists who are willing to disregard the sacred trust of professionalism, merely to avoid the necessary technical procedure to obtain the best results. I believe it would be a God-send to humanity and to our profession if all forms of porcelain crowns which can be used as ground joint crowns were eliminated.

Shell crowns, for many years, have been regarded as the peer of all crowns. And I will admit that in some cases they have served humanity well, but in many cases they have been a menace to health and comfort. I know of nothing more difficult than the preparation of a stump for a shell crown. I will venture to say that not more than five per cent. of the shell crowns placed in the mouth would be regarded by a competent judge as an accurate fit of the band at the gingival. Granting five per cent., we have in that five per cent. the thickness of the band, falling short of the same degree of perfection we have in the "cast base dowel crown," which will be sufficient to invite disease and preclude the possibility of scaling the root in case of future calcific deposit, not mentioning the remaining ninety-five per cent., fifty per cent. of which should be classed as malpractice.

I believe I will be safe in saying that five per cent. will cover all the cases of shell crowns now in the mouth conforming to requirement No. 2, that of "proper contact form," the lack of which means discomfort to the patient, disease of the soft tissues, and final loss of the tooth. Out of the five per cent. that conform to this requirement in the construction, many destroy the contact point in mounting the crown, due to the pliability of the band employed. This could not occur in the application of an all-porcelain crown, and my observation has been that the percentage is very small where this requirement is neglected where an all-porcelain crown is used.

Requirement No. 3 is that of "occlusal form and general contour." About what per cent. of the practicing dentists would be able to satisfy the manufacturers of the Trubyte teeth, as mold designers, or any of the manufacturers of scientifically designed artificial teeth? Very few, I am sure. And those few would have to undergo considerable preparation.

And why so much attention given to the general contour and occlusal form? First, for the prevention of disease; second, for the sake of efficiency; third, for the esthetic effect.

The proper contour of the lingual and buccal, or labial, is a preventive measure by virtue of the fact that the food in the process of mastication on properly contoured teeth is thrown away from the gingival margin, thereby preventing constant injury to the soft tissues. If we hope to insure comfort and eliminate a certain cause of disease, it is absolutely necessary to secure the proper occlusal form. In order to accomplish this, it is essential for the dentist to understand (as Doctor Ottolengui has put it) "Masticatory Mechanics," or, in other words, he must understand the importance of the marginal ridge, the occlusal fossæ, and the buccal and lingual slushways, and their relations one to the other; also, the proper relation to its opponent in the opposite jaw. And unless all the above points are observed, the following conditions will exist, in proportion to the degree of imperfection in the occlusal form, to-wit: Forcing of food into the interproximal space, breaking the porcelain, if used, or forcing the tooth out of line and defeating the principles of mastication.

I advocate the use of replaceable porcelain teeth in all cases where the bite is sufficiently long, because of the advantage porcelain affords in securing the proper occlusal form, because of its greater efficiency in mastication and on account of its esthetic effect.

I advocate the use of a cast-base dowel crown, employing a replaceable tooth, or facing, in the anterior or posterior portion of the mouth in preference to a shell crown, for the following reasons: First, because, in the opinion of the writer, one can more closely approach perfection, in the point at the gum line, by employing a cast-base dowel crown. Second, because one can select a replaceable porcelain tooth which meets the requirements of occlusal form and general contour, and my observation is that few all-porcelain teeth inserted in the mouth, retained by a dowel, fail to have restoration of contact point, maintenance of the interproximal space, and proper occlusal form. Third, because of the esthetic effect of porcelain over gold and because of the porcelain occlusal surface being much more efficacious in mastication.

I know of no better method of construction than the following:—Prepare the root in the usual way for a plate dowel crown, select a Blue Island band of aluminum, 36 gauge and proper size, insert dowel in canal, reduce band to about one-sixteenth of an inch in width, replace on root. The band confines the wax and with a large amalgam plugger a perfect adaptation to root can be obtained. Before chilling, take hot canal plugger and fuse wax to end of dowel, insert sprue pin, chill and remove wax form with band in position, remove aluminum band, invest and cast. If band is desired, employ a band of 22-k, 36-gauge gold instead of the aluminum band and cast direct to band and dowel.

By employing 24-k. gold for the cast base, it can be adjusted easily, swaged and burnished to the basilar end of root, in the mouth, and I know of no better instrument to use for swaging the thin cast base of 24-k. gold directly to the root, than a home-made instrument which I have used for some time.

Select a rubber instrument handle of medium size, drill a hole in the end, into which insert vulcanite rubber. This makes a most excellent swager and one which inflicts little pain on the patient. A few blows with a hand mallet, with a rubber against the cast base, forces it home, and by the use of the burnisher one can get an accurate adaptation. Bite and impression are taken with base in position, removed, and mounted on the articulator, backing is made for the porcelain facing, case is waxed up, invested and soldered.

PORCELAIN JACKET CROWN*

BY DR. GEORGE T. GREGG, PITTSBURG, PA.

This method of making a porcelain jacket crown is as follows:

First: Remove enamel with stones and burs.

Second: Take impression with ferrule containing modeling composition.

Third: Fill impression with cement.

Fourth: Take bite and place cement model in bite and place on articulator.

Fifth: Burnish 1-1000 platinum on cement model of end of tooth.

Sixth: Bake porcelain on platinum matrix.

*Clinic Odontological Society, W. Pa., 1915.

A PLEA FOR MORE EFFICIENCY AND BETTER FEES*

BY CHARLES A. TAVEL, D.D.S., MEMPHIS, TENN.

IF I WERE TO SAY even half that should be said, and as much as I should like to say, upon this very important subject, I fear there would be left but a short time in which to read and discuss the many valuable essays that are to follow. It has been my privilege to be identified as a member of this association nearly eighteen years, and if there ever has been a moment's time when I had cause to regret having cast my lot among you, my memory fails to recall it.

Mr. President and members, permit me to say, and with as much emphasis as I know how, that I believe there is no higher calling under the canopy of Heaven than that of dental surgeon. But are we really cognizant of this fact, and do we actually realize how great is the responsibility that we took upon our shoulders when we became engaged in this great field of work? Do we realize how much our calling has to do with the health, happiness and general welfare of the human race? And if so, are we striving to get the very best out of everything pertaining thereto, in order to more thoroughly qualify ourselves, to the end that we may become more efficient in the performance of our duty? I fear that after a careful search for an answer to this question we find that only a negative reply exists. But, be that as it may, we cannot disregard our obligations and indulge in other than the most careful, painstaking manner in the simplest operation and still expect to retain our standing with those who are endeavoring to keep abreast of the times.

We should be amply qualified to recognize the physiological and pathological conditions of every case that comes under our observation, and not until we are can we look toward receiving the same compensation for the time it takes us to perform an operation as those of any of the other professions. And why should not such condition of affairs exist at the present time? Are we not required to stand as rigid examinations to enter college, to attend as many terms, pay as much tuition, study as many books, do more physical and as much mental work, spend more money in equipping our offices, and last but not least, relieve perhaps as many ailments, directly or indirectly? Now, upon whose shoulders rests the responsibility for such existing conditions? It is placed upon none other than each individual member of the dental profession. We have been entirely too reluctant in placing that high estimation upon our services, and it seems to me that we should work out some plan by which we could secure more uniform fees.

We should, however, not gauge the compensation for our services by that of members of other professions, except to the extent of placing as high an estimation upon our competency and skill as our conscience will dictate, keeping in view the fact that it must be *governed by the results* we obtain by our careful, painstaking and efficient service. And should we fail to inculcate into those over whom we toil with every fiber in our bodies strung to the highest tension, that feeling of confidence and appreciation of our honesty and ability, then we fall short of fulfilling the mission to which we are called.

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*Read before the Tennessee State Dental Association, 1915.

So the question now comes up as to what course to pursue in order to educate our patients to the necessity of recognizing the fact that we should be better compensated for our services. The old adage, "Nothing ventured, nothing gained," applies here as elsewhere, and it is up to each individual whether he shall continue in the same old beaten path. I dare say that there are many here who are charging no more for their services than they did ten or fifteen years ago, when they had but little experience or skill, and now having progressed with both, as a matter of fact they should be getting twice as much, or more. And the reason is we are too prone not to place the estimation upon our service as high as we should, perhaps, through fear of offending and driving away some of our patrons. Is it not a fact that during the above mentioned time the price of almost every necessity of life has doubled, trebled, and in many cases quadrupled? Take for an example an hour's work. Is not our service worth as much as that of other professional men? Who ever heard of a dental surgeon getting $50 for an hour's work, except in very rare cases? A skilled surgeon would consider his compensation very low at that figure. Yet, compared to the lawyer, the surgeon is poorly paid and, compared to the surgeon, the dentist is the poorest paid.

Now, we come to the young practitioner; can he obtain as good fees at first as in after years, or as much as those who have given up their lives to hard study and research work? Of course not. But is he expected to charge the same that he did in the beginning? This, I fear, is too often the case, and if this message has impressed upon you the necessity of exercising your gray matter to the end that when you go home you will resolve to steal away from that old beaten path and to become more efficient in every operation, and thus strive to obtain better fees, which you so justly deserve, then I feel that I have been bountifully compensated for my efforts in your behalf.

A SANE SYSTEM OF KEEPING BURS*

BY DR. R. C. SIMMONS, DETROIT

Arrange a stock box about 11 x 9, divided into a hundred compartments, deep enough to carry about two dozen burs, each compartment marked with number of bur. Also a small bracket table box which will hold about a gross of burs, with a cover which makes it dust-proof. As the burs are used from this box, they are either discarded or turned over to the assistant to be sterilized and returned to the bracket box. You can tell at a glance at the stock box the burs you need at any time, so you will never over-order or under-order on the sizes used constantly.

*Clinic Michigan State Dental Society, 1915.

CROWN AND BRIDGE WORK*

BY W. O. HULICK, D.D.S., CINCINNATI, OHIO

ON THE WALLS of the Literary Library, in our city, is this inscription, "Here comes one with a paper." We are always delighted with a paper on scientific research work if that one is Price; yes, we go early and stay late, so eager are we for a report of the Scientific Research Commission, along with the many good things given us at all times by a man with a big heart and unselfish nature.

One of the most beautiful tributes I have ever heard was paid our late Doctor Fletcher by Doctor Price. In part he said, "To know him was to love him," and perhaps the profession will never know how diligently he worked along scientific lines and always with a definite purpose—humanity. He also stated, and I dare say, few are aware of the fact, that when the National Scientific Research Commission was organized, they selected Cincinnati as the first meeting place because, he stated, it was the center of scientific research work up to that time, due to Doctor Fletcher's personal effort. I have personal knowledge of his experimentations with the microscope and various other ways, extending back over a period of twenty-five years, spending hundreds of nights working out problems of everlasting benefit to humanity; a paper from Fletcher gave us much to think about.

Then comes another humanitarian. One who almost paid the price with his life, from overwork and worry, that the profession and the great people might be everlastingly benefited. The toothache film shows the character of Ebersole, and a paper on oral hygiene from him is always appreciated.

Then we have Callahan, who makes us all take notice, for he deals scientifically with one of the most important branches of our profession. He does not claim to fill all root canals perfectly to the apical end as do many others who write on this important subject; but, gentlemen, his root canal work, as presented to our profession, is a revelation, which likewise proves that nothing can be accomplished except by hard work.

His has been a labor of love, and whenever he has nothing of importance to do, a tooth is selected (yes, I will say several, at a time) for comparison. These are then imbedded in plaster, when he attempts to open the nerve channels and fill them.

I use the word "attempt," which is a correct expression according to his statements, and is proven to be a correct term, as shown by the sections after grinding. A paper from Callahan always fills the hall, whenever read.

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*Read before the Rehwinkel Dental Society, Chillicothe, Ohio.

Another hard worker who knows his subject well is Wilson, and a program graced with his name insures to us all one good paper at least, at the same time stimulating us to go home and improve our prosthetic work.

And thus I might name others in our state—"our state," please note—who work just as hard, are just as capable, just as scientific and are as successful in the application of all mechanical and operative dentistry, and in the treatment of all lesions of the mouth, as in any state, or anywhere in the world.

Ah, yes, all subjects are presented, from how to run an office, up to the most scientific subject, except crown and bridge work, a subject, according to remarks overheard from time to time, which is "too dead to bury" and a "waste of time to hear a paper out," so they always "cut" that number on the program.

In the face of all this apathy, I have the temerity to come before you tonight with a paper on a subject that, according to some, is too threadbare to get a patch large enough to cover one full hour's discourse.

I shall endeavor to disprove this, and to prove to you, beyond a question, that it is a very live subject, and one of the most important for our consideration and for reasons I shall try to make clear to you. However, crown and bridge work has been condemned to die an ignominious death by many members of our own and the medical profession, and not without good reason at times, I am also sorry to admit.

I therefore stand before you tonight without fear or favor, and say that crown and bridge work is *not* to die an ignominious death—but is to live on to the end of time, as one of the most useful of all mechanical replacements when scientifically constructed and adapted.

I likewise wish to state, also without fear or favor, a lamentable fact —that crown and bridge work is most detrimental to roots of teeth and contiguous tissues and the general health of all the replacements, if faultily constructed and adapted.

I am on record for the statement that it is the methods employed in its adaptation, selection of cases, treatment and care of same, by the patients —that should be condemned in the severest manner.

I take it, from observation and comparison, that many more teeth are lost from unsanitary conditions than from faulty crown and bridge work, and that it is not altogether fair that the blame should rest too heavily on it alone.

I likewise take it, from observation, that even where poorly constructed and faultily adapted, the patient is largely at fault for the septic condition usually found, which causes systemic disorders of various forms.

This is also true many times where the replacement, whether crown or bridge, is scientific in construction and adaptation. However, we must admit when all conditions are equal and favorable, the chances for deleterious influence is reduced to a minimum.

Another word in defense of crown and bridge work: as compared to other partial replacements, either gold or vulcanite, observation has led me to believe there is no difference, taking them as a whole, for septic conditions, loss of teeth, from impaction of food, retention of liquids and saliva to ferment and decompose, do cause the same destruction and system disorders as do crowns and bridges.

Therefore, it is not deniable that all forms of partial replacements, while beneficial to a greater or lesser degree, do cause an alarming loss of teeth and conditions we all deplore.

This brings us to the great question, What are we to do about it? I shall endeavor to tell you, from my viewpoint, some of the fundamental principles which, to my way of thinking, are imperative, and if observed, will bring results to you as they have to me, both gratifying and satisfactory to all concerned.

First, I desire to go into a short preamble of the requirements of natural organs of mastication in their natural environment.

The teeth in their normal and natural condition are perfect in form, arrangement and occlusion; incisors to bite off, molars to grind, triturate and mix food stuff to nourish the body. The lower are arranged in a mandible hinged in condyles so accurate, indeed, that no forcing out of their normal arrangement is possible so long as all teeth remain in the upper and lower jaws. These teeth are peculiarly arranged in bony sockets (alveolis) lined with periosteum, themselves covered with peridental membrane, the alveolus and jaw having a covering of mucous membrane, generally called gum tissue.

Now, in order to get an intelligent discussion as to the necessity of teeth to civilized man, at this time and age, and the needs in the future, we must assume that they were intended to be a permanent part of our body and to do a good service throughout a natural lifetime. Furthermore, they should be kept in perfect condition, in perfect occlusion, alignment and number, so long as the body lasts, to perform and to do perfectly their functions as designed by the Creator. This will be so carried on when the environment is normal. Thus the mouth will be kept cleaner, freer from decay and oral diseases, the body will naturally be more evenly balanced and healthy, senile decay will be put off, making the natural expectancy of men what it should be. Now, in this normal and natural condition, we will consider how much work is required of the teeth each day to keep the body well nourished and in good health. First of all, the teeth are required to prepare perfectly three meals each twenty-four hours, biting off and chewing or triturating each morsel of ordinary food, ten to twenty-five times, while meat will require from forty to sixty closures; a person consuming from ten to twenty morsels of meat each meal, or twice daily. We will conclude, from these notations that the closures or trituration will be from one thousand to fifteen hundred times for an ordinary meal, while for a large meal it will be from two to three thousand. If you will stop to calculate the number of triturations per day, then multiply this with three hundred and sixty-five, you will find the sum total to be at least one million to a million and a half at the year's end. Again, you will please note that in this act of preparation, the stress will be from 25 to 150 pounds for meat of different kinds, according to the person's occupation and environment, while over the molars the muscles of mastication can be trained to exert a stress of from 200 to 300 pounds. I am giving you these figures for future comparison, to prove to you the enormous amount of work that is expected of the natural teeth, also the great amount of strain that will be exerted on one or more of these teeth when engaged to carry substitutes where one or more intervening teeth have been lost. Mr. Gladstone was once asked, "To what do you attribute your good health and long life?" He replied, "To proper mastication of my food." When asked what he meant, he said, "I have thirty-two good teeth, and consequently when I masticate my food I give each morsel of food that goes into my mouth thirty-two bites."

From the foregoing facts, we must acknowledge that if these normal conditions can be maintained, the teeth will remain well rooted, freer from decay, mouth and contiguous parts healthier, which is conducive to a better physical condition. Let it be understood that I am an advocate of hard food, vigorous chewing and thorough preparation—clean, wholesome mouths with a full complement of teeth in perfect occlusion and alignment, so that the original plan of nature may be carried out as nearly as possible. That this is not carried out is evidenced every day by the constant loss of teeth from many causes: decay, predisposed and exciting, the latter acquired, causing loss of the nerve, followed by abscess and subsequent loss of tooth, unless they are thoroughly and properly treated and filled. Gingivitis, which is a natural process taking place in an abnormal way, usually from tartar deposits which is a normal constituent of saliva deposited in the protected places, which in time induces any of the following consequences: chronic, ulcerated stomatitis, putrid sore mouths, receding gums, sore, spongy or bleeding gums, chronic gingivitis, gangrenis gingivitis, non-suppurative gingivitis, suppurative gingivitis, which is generally called "Rigg's Disease," or pyorrhea alveolaris. Unclean mouths, in connection with tartar deposits may also cause some of these same conditions, which in time induce destruction of the mucous membrane with subsequent loss of the teeth.

The late Doctor Fletcher, of Cincinnati, who made diseases of the mouth a special feature from a scientific and practical standpoint, has adopted the following nomenclature which covers those dreaded conditions:

Initial or simple Alveolitis—
Non suppurative Alveolitis—
Suppurative necrotic Alveolitis—
Acute Alveolitis.

The descriptive subdivisions are:
Chronic non-suppurative—
Chronic suppurative alveolitis—
Necrosis non-suppurative alveolitis, which is always chronic—
Necrotic suppurative alveolitis, which is nearly always chronic, but may be acute.

Unsanitary conditions hasten these disorders, and in the advanced stages cause the loss of one or all of the teeth. Furthermore, it might be safely asserted that the above named diseases of the mouth probably cause the loss of more teeth than all other causes combined.

Conditions of this nature make repair extremely difficult and unsatisfactory. Especially is this so with crown and bridge replacements, which are prohibitive, except when constructed absolutely sanitary, and only with a thorough understanding as to cleanliness and probable length of time and amount of service they will perform.

Many articles have been written bringing out some very valuable discussion regarding the necessity of teeth to masticate food for the maintenance of the human body. Please allow me to quote from an article written by an eminent authority:

"There seems to be something about man when he finds he is able to supply these losses, eyes, limbs, hair and teeth, which so set him up in his own estimation that he never loses an opportunity to try his hand, and in regard to mouth and teeth, it is my opinion that many times people are worse off for the effort. In cases where all the teeth are lost, great benefit may result from substitutes, but no artificial denture is at all comparable to good, natural teeth, even if the work be perfect, but poor work seems to be the rule, and perfect work rare." To further quote this same paper:

"With civilized men the teeth have almost ceased to be a necessity, as the grinding of food can be replaced by machinery and cooking. The necessity for masticating food is almost completely done away with in man."

I agree with that part of the aforesaid regarding the loss of the entire dentition and will admit that predigested food may maintain life for a time, but we are all agreed that the latter is not in accord with the intention of nature, and cannot be continued any great length of time. When artificial teeth can and are made to successfully perform the process of mastication, there is no logical reason for avoiding the participation in solid food.

Persons who have suffered a partial or total loss of teeth and who lived on prepared food, always show signs of malnutrition, are anemic and generally show signs of nervous and intestinal disorders. I will quote another eminent author: "The mere fact that the chemist has prepared artificial food that can be digested without mastication is no argument against the use of teeth for masticating purposes. They have been obliged to do this to help out the people without teeth, or the people who are too lazy to use their teeth. In a certain sense nature, after a time, gets rid of the teeth, but why? Not from a physiologic standpoint. It is senile decay. With proper care of our teeth and of the general health and by eating proper food, senile decay can be put off."

Gentlemen, I have gone into the above with a definite purpose. First, to fix in your minds the necessity of teeth to the human body and what is expected of them in their natural condition. Second, unsanitary mouths or other conditions, which cause the oral diseases and loss of teeth, and the effect on the body and general health. Third, replacements, their necessity, advisability and benefit derived by their adoption. Fourth, amount of service required of such replacements. Fifth, oral diseases and systemic disorders caused by their insertion at times.

So much has been written upon this important branch of our work that one cannot hope to present anything startlingly new or original. I will, therefore, direct my thoughts to methods of procedure worked out by men of mechanical and manipulative ability and urge those of you who have not to adopt and help to further perfect them rather than to look to theories and methods, the character of their practicability, which seems to be doubtful, and to impress upon you the satisfaction obtained and the extent my practice has been revolutionized in the past few years by adopting systems which offered and insured the best results obtainable.

Now, inasmuch as results are the all-important factor, and inasmuch as they are not always obtained (and especially is this true of a large percentage of our colleagues) it will be necessary to intersperse my message to you with some comparions, for which I wish to apologize. It is a delicate point to touch upon, and as I do not wish to be misunderstood in this connection, I will explain that it is not critical in the least; but to make some observations of incorrect technic and application which will more forcibly call to your mind some of the wonderful opportunities present-day possibilities afford for more correct technic and application, which will insure to you, as they have to me, results heretofore thought to be impossible.

Observations have led me to believe that good judgment is not always exercised in the selection of cases, and that skill in the application of system and methods of procedure is lacking to an alarming degree, which I will illustrate to your satisfaction by means of slides later on, and that great reforms are forcibly indicated, there is no question. It would seem reasonable to suppose, owing to the superior knowledge we have today, that all dental operations of a mechanical nature would be carried to scientific completion according to cosmetic, physiological and pathological requirements; that this is not so to a greater or lesser degree, we must admit. Therefore, it will be necessary to deal with the subject from different angles, reviewing the past, looking at the present as it is, anticipating the future.

Our ideals are different, likewise our viewpoint; we have difference of opinion, which is our privilege; some have knowledge and good judgment associated with mechanical and manipulative ability. There are those who have the latter, while the former has been questioned at times, and vice versa, and unfortunate is he who does not possess these qualifications, although he works hard at times to attain them.

It is not essentially my purpose, therefore, to point out to you rules and methods of procedure that are imperative. On the other hand, it is my pleasure to mention some of the many improvements that have been gratifying to me and satisfactory to those I have had the honor to serve. Recognizing and being ever mindful of the obligation we owe the patient, who properly profits mostly by improved methods and simplified technic, I am grateful to those who have successfully helped to lighten the burden of the dentist and diminish the discomfort usually attending any dental operation.

Granting the advancement made in all dental operations, which will insure greater satisfaction to the dentist, a longer and better service to the patient, there still remain two factors absolutely essential and imperative:

First, we are morally bound to render a service to the best of our ability, a service justly due the patient.

Second, those we serve are morally bound to protect our efforts against undue usage and uncleanliness so as to insure for themselves the longest possible service.

Of the first part I wish to say we should observe the Golden Rule as nearly as possible, rendering a service for our client as we would have it performed for us under conditions as they exist, whether favorable or otherwise. The patient is trusting; too much so at times, I fear. How are patients to know whether a crown is well adapted or not? What knowledge have they as to the adaptation and occlusion? Very little; in fact, all they have is confidence which, gentlemen, is misplaced many times, placing the ever-trusting patients completely at our mercy, having no thought of the danger they face at times, because of faulty adaptation of crowns and bridges.

If you will pause for a moment we will tell the patient what all this may cause: Irritation at gum margin from bands that do not fit; inflammation on ridge from faulty adaptation of supplies, which impinge and form pockets that collect food particles and saliva to decompose, making a home for all kinds of micro-organisms which are washed into the stomach; poor occlusion and misapplication of force which, in time, because of abnormal and unsanitary conditions, induce gingivitis, bleeding gums, putrid sore mouths, resulting many times in oral sepsis, which is particularly severe and hurtful in its effects, for this sepsis produced by these abnormal conditions are dammed up in the bone and in the periosteum and cannot be gotten rid of by any antiseptic or instrumentation which the patient or dentist can carry out, except in loss of tooth, which is almost sure to follow. Many times, aside from a slight soreness accompanied by bleeding, this condition is at first painless, steadily accumulating in intensity without drawing particular attention, resulting in either anemia, gastritis, colitis, obscure fever or purpura, nervous disorders of all kinds, chronic rheumatic affections or kidney diseases.

It is for the dental profession to solve this important problem to the interest of public health and it is for this reason and no other that my writings are directed to comparative work, for my observations have led me to know that a large percentage of our profession is steadily engaged in combating successfully with these problems, first, by adopting systems and perfectly adapting them; second, by educating the public in oral hygiene and sanitary conditions that will prevent oral sepsis.

My observations also lead me to know and deplore the fact that another percentage of our profession is steadily engaged in promoting sepsis of the worst character and degree, ignoring the fundamental truth connected with the anatomy, physiology and pathology of the tissues with which they deal.

Now, gentlemen, the masses take it as a matter of fact that we are all capable and trustworthy; they are too busy with their own affairs to doubt that this is so, and it is our duty to so conduct our professional obligations as not to betray that trust.

The aforesaid conditions are largely due to operations of the past and by operators who were ignorant of correct technic, mechanical requirements and the pathological disturbances which were directly due to poor dental operations. At the present time, crown and bridge work is beginning to be so perfected and a greater percentage of dentists are profiting by past experience that helped to cause the deleterious conditions, that in the future these conditions will almost entirely disappear.

That crown and bridge work is a necessary replacement, and can be and is made by thousands of our dentists absolutely perfect and durable, there is not doubt; also that the oral hygiene movement is helping wonderfully to further improve oral conditions by teaching the public how to clean their mouths and teeth and how to keep them so.

Of the second part above referred to, I will say in behalf of those we serve, that they should be taught the use and abuse, the possibilities and probabilities, the amount of service expected, length of time that crowns and bridges or other replacements are expected to last. I believe a patient has a right to know, or should have the knowledge to be able to judge, a good service from a bad, for it is my belief that not half of those we serve know a good service from a bad. I also believe that the demand for better service is greater (by the masses) from day to day, and I am also constrained to believe that when the aforesaid has been carried out, those we serve will appreciate and reciprocate by fulfilling the obligations they really owe us.

The dentist and patient are jointly responsible for a too universal adoption of bridge work, especially in large restorations and under conditions where it is contra-indicated. The term, "fixed bridge work," seemed to fill a long required need in the minds of dentist and patient alike, for it could be permanently fixed, cemented to place, so that it would "never come out," which appealed to them, especially to the patient, as being nearer akin to natural teeth, and after a time the wearer becomes unconscious of their presence in the mouth. The term "false teeth" is extremely repellent to most people and the fact that they must be removed frequently for cleaning is a constant reminder that they are "false teeth," and they never forget them; also they were unfortunately advised, as many dentists justly believed years ago and, unfortunately, many do now, that a cemented bridge was and still is just as good as the natural ones and would last the remainder of their lives. In this way they felt perfectly secure, not alone as to the usefulness and durability, but also as to cleanliness and health.

At the present time we are all agreed that some patients would be better off without bridge replacement and that poor judgment in selection of the case by the dentist, or over-persuasion on the part of the patient for reasons aforesaid, are responsible for the act. We should not condemn this form of replacement too severely, however, for replacements of some kind are a necessity for proper mastication, and just as long as the teeth are lost by whatever cause, just so long will crown and bridge substitutes be constructed, even to the end of time.

With the loss of teeth from any cause, many changes occur, making abnormal conditions, perplexing problems for any form of replacement, and especially is this true in Rigg's Disease cases in advanced stages.

Some of the prohibitive cases for bridge work are where teeth are elongated, because of no antagonism. Other cases almost prohibitive are where teeth are malposed, which puts them out of occlusion and alignment. All of these conditions should be more thoroughly understood by both dentist and patient.

Each case presented should be individual; we should prescribe treatment as a physician would prescribe, according to conditions. Study models should be made after thorough prophylactic treatment, and all teeth have been put in good order, with notations to plan a method of procedure that will give the longest and best service, either fixed or removable.

Some of the unfavorable conditions would be abscessed teeth that have been treated but are still sore, indicating probable short-time service; teeth not deeply rooted; also a span which is too long for two teeth, as abutments, to carry. Another feature, probably the most important one in this connection, is diseased condition of the teeth and gums that is chronic, and especially is this true in all unsanitary conditions or where the individual habits are careless, for if so, it will follow that they will be more so with bridge work.

We must look into another and not the least important of the many points to be observed and that is the force applied, or pound pressure in the act of mastication. In connection with bridge replacements, it would naturally follow from the knowledge that we have in this connection that all bridge work is temporary, inasmuch as each tooth was expected by the Creator to do its own work and no more; however, experience has taught us that two good, strong teeth will give a long service, carrying two supplies, provided the superstructure is well adapted and the occlusion is natural.

Referring to the notations regarding pounds' pressure in the act of mastication: We must conclude that the teeth which support a bridge are required to bear more force and pressure than nature intended; where the place is large, many times more, and the bridge being permanently attached, at no time can any rest be given the abutments or the contiguous parts by its being removed. Thus it would seem a violation of all the laws of nature to expect four teeth with caps or crowns to support a piece of bridge work of fourteen teeth.

Bearing upon the requirements in this particular, it has been stated by some authorities that by uniting two or more teeth the movement of each is so modified and restrained as to enable them to successfully withstand more force than the sum total of their separate resistance. I do not believe that nature will strengthen teeth so engaged to accommodate our method of misapplied force that is unnatural and unreasonable in their demands for proper mastication. The force of the bite or the pounds' pressure with which the jaw may be closed upon an object, as before stated, varies greatly among different persons, and is dependent in larger degree upon the peridental membrane, and upon personal habits in the use of the teeth in mastication, than upon muscular force. In this connection where a fixed bridge is employed for mastication, the force of the bite of an individual is modified from time to time, pounds' pressure becoming less and less as the teeth engaged as supports weaken, with the usual consequence, premature loss of supports.

It would naturally follow that to get the greatest possible service from bridge work it must be constructed on natural lines—cusps to fit into cusps so as not to force themselves or their antagonism out of alignment or occlusion; bands must be properly adapted to neck of teeth to be used as supports, conservation of supports by not overloading them with too many supplies, and at no time placing fixed bridge work in unsanitary mouths or where teeth are loosened from decay or diseased conditions.

Another important feature to observe in crown and bridge work at the present time is the being able to conceal the artificial to an appreciable degree without sacrificing masticatory requirements.

Single porcelain crowns are so accurately adapted as to almost defy detection; however, experience has taught us the inadvisability of all-porcelain bridges, and those who were over-enthusiastic when this form of bridge work was first introduced, were compelled to discard it as impracticable, as porcelain does not possess integral strength necessary for mastication.

Since the advent of bridge work, superstruction of metal has been employed with teeth attached by some form of metal pin baked in the porcelain, and experience has taught us from frequent fracture and difficult repair the advantages of porcelain as strong as possible, which can be obtained only in the replaceable form of teeth, thereby enabling us to use more porcelain and less gold without sacrificing either of the aforesaid requirements to any appreciable degree, and making, at the same time, easy repair possible without disturbing the superstructure—an advantage very essential in all bridge work.

This method is almost universally adopted, employing the casting process, which means easier and better adaptation by some operators, which is absolutely essential; however, the swaging process has many advantages in some technic, we are free to admit. It has been experienced by many that cast metals are not by comparison as strong as melted or rolled metal, therefore, I would recommend strengthening all cast portions where great stress is exerted.

Believing, as we all do, the necessity for accuracy in adaptation and utility in strength, combined with the cosmetic, and that all porcelain teeth or porcelain facings should be employed within the line of vision wherever possible, we are also agreed that changes take place in many mouths from early extraction or loss of teeth from whatever cause, or wearing down of the natural ones, which would make the above-named course of procedure a great sacrifice of strength and utility under masticatory stress. It is therefore my practice to take the "middle of the road" plan—i.e., the safe and sane plan of strength and utility even though I am obliged to sacrifice appearances to some degree.

Now, inasmuch as we are victims of circumstance in the loss of teeth, as we also are in the loss of any other part of the body, consequently the three prime factors in crown and bridge work replacements are perfect adaptation, which means longer and better service, stress to resist the great amount of service required, and appearances, or the cosmetics, whereby the artificial can be concealed to an appreciable degree.

We will now look into some of the different forms of replacements, taking up the straightening of single gold and porcelain crowns first. There is no plausible excuse at the present age for faulty adaptation of single crown and the adaptation of the different forms of all porcelain teeth with dowel, which can be made so perfect by grinding base to tooth root, also shape and contour, as to almost defy detection. The casting method plays a big part in this line of work, for roots that are irregular from decay or fracture or for any reason, such as inability to grind surfaces to fit.

Regarding bands for the single crown, many operators differ in opinion even though they fit perfectly, and be that as it may, good results—lasting results, if you please—are obtained either way with only occasionally a split root, which may and has happened with or without band, and is usually due to faulty occlusion or accident, and not from method employed.

It is therefore my opinion that inability to fit a band properly is the only real reason for condemning them, either for porcelain teeth or gold cap crowns.

The most important feature in crown work where bands are used is root preparation, and it is probably sadly neglected by most operators to an alarming degree, and observations have led me to know that faulty preparation seems to be the rule and perfect preparation rare.

To what extent radiography will be used in this connection I do not know. However, I will say at this time, many unfavorable disclosures have been made which have helped me in many ways to improve my technic so that it is my pleasure at this time to make a perfect gold crown, which I am happy to show you on this occasion. I believe it is the negation of all the truths of nature to improperly place bands on the roots of teeth and to impose too much work on abutments and in mouths hopelessly unsanitary. Where mouth hygiene is doubtful, the pathological conditions unfavorable, bridge work of a removable nature should be employed or some of the different forms of attachments employed on partial dentures, not alone because of better sanitary conditions, but also to equalize force. Recognizing, as we must, the stress in pounds' pressure, in the act of mastication, and the number of triturations, it would naturally follow, where the restoration is large, it must be made removable in some form so that the ridge being covered by a saddle will receive and resist most of the impact, the teeth serving mostly to hold the piece in position.

The saddle will also partially resist lateral action in trituration, as the natural mobility in time has a tendency to loosen teeth attached as supports.

As to the hygienic condition, by comparison as between fixed and removable bridges or partial plates, if you please, if the abutting teeth have been well prepared, all things being equal, there seems no difference in my mind. It has been my good fortune to see a great many methods of removable bridges and to have adopted some successfully in well selected cases. However, it is my belief and advice that no man should undertake this line of work unless he has unusual mechanical and manipulative ability, as the technic is intricate and unless perfect in every detail, it will fail absolutely. Of the many forms of bridge work in use today and variations of conditions presented for advice, adoption and construction, I can only say that inasmuch as each case is individual, which calls for different treatment and application, a man must use good judgment and use only the method he is capable of carrying to a successful completion. I do not think it wise or feasible for a dentist with ordinary ability to undertake methods of procedure the practicability of which, as stated before, would seem doubtful to them at least, and which could only be carried to a successful completion by men expert in these particular lines.

I would therefore again urge anyone in doubt, to improve his technic and knowledge of application and continue to employ methods within his capability, for the object after all in our life work is service—the best we can do, and for the longest possible time.

The personal equation plays no small part in all dental operations; consequently, as mentioned elsewhere, it is not my object to dictate to you methods that are imperative, neither do I wish you to misinterpret my message as moralizing, for far be it from my mind to point out the mistakes of my brother for any reason whatsoever, other than for our general uplift and for the good of humanity, the people whom we have the honor to serve to the best of our ability.

DISCUSSION

HUGH W. MACMILLAN, Cincinnati: The subject "Crown and Bridge Work," as chosen by the essayist, is one of the most important subjects for discussion in dentistry today. Oral sepsis caused by unhygienic prosthetic appliances is being justly scored by physicians and progressive dentists as being the cause of many heretofore obscure diseases which are now directly traceable to septic areas caused by these appliances. A paper by Doctor Hulick on this subject is of special interest as he has long been known as an exponent of sanitary dentistry. The results he has achieved along these lines show originality and research for which qualities he should receive his chiefest praise.

It has long been known that the normal mouth contains about fifty varieties of bacteria. These bacteria exist in the interstices of the teeth under the free margins of the gum and in areas which are not self-cleansing. The addition of unhygienic crowns and bridges, poorly finished fillings, improper root canal fillings, and various other unsanitary prosthetic appliances, greatly increases the area for the culture of the bacteria which rapidly multiply in these ideal surroundings. It has only recently been shown that non-pathogenic bacteria, as they usually exist in the mouth, may by a series of transmutation change into more dangerous varieties. The excursions of the bacteria into the gums and alveolar process changes their environment. Coming from an area richly supplied with oxygen they gradually pass further into the tissues where the oxygen is less abundant and actually change as to shape, size, and selectivity for the various tissues. The danger of the organisms is not due to their pathogenic properties but to their selectivity for certain tissues of the body which they acquire in their change. The constant absorption of these bacteria and their toxins breaks down the individual's natural immunity, resulting in various forms of arthritis and inflammations of the membranes of the body.

A typical case is that of Mrs. F. T. S., aged 43, who was referred by her physician. Her knees, ankles and toes were swollen and stiff. Her right hand was numb and stiff. The forefinger and thumb of her left hand were numb and beginning to get stiff. She would have periodical eruptions on her skin which would itch intensely. She complained of a shortness of breath and a sense of fullness in breathing.

Her mouth presented the following conditions: On the lower right side, one molar tooth crowned, with resorption around the neck of the tooth and at the apex; upper right side, one two-tooth bridge with ill-fitting crown, also a root under the "dummy;" on the lower left side the root canals of the lower second molar filled with cotton, resorption at roots; on upper left side, upper first molar with process completely resorbed and discharging pus. There were also several Logan crowns with unfilled roots and pyorrhea pockets in various parts of the mouth. Following the extraction of certain teeth and the treatment of the gums, the conditions described above have completely disappeared and have not returned in several months.

Bridge work to be sanitary must be of such a kind as to be easily cleaned by the patient, or, better still, to be self-cleansing. The practice of inserting bridge teeth into the sockets of the extracted teeth must be condemned. The cosmetic effect is very apparent, but food will always collect above these bridges and form an ideal habitat for bacteria. In the case of a young lady wearing a six-tooth anterior bridge constructed according to the above description, the alveolar process above the bridge showed distinct rarefaction and in places resorption. These areas of lesser resistance caused by such appliances so constructed are also infected from bacteria from the blood stream and hence should be eliminated, as their presence will work more injury than the benefits derived from the denture. The recent findings by research workers has seemingly changed the whole aspect of dentistry. The removal of a pulp from a tooth lessens that tooth's vitality to resist infection and forms an area of lesser resistance to become infected from the blood stream. Unfilled root canals or canals filled with a strong antiseptic (viz.: formocresol) have been definitely shown to be the most insidious areas predisposing infection. Fillings which are left untrimmed at the neck of the tooth form an ideal habitat for bacteria to enter under the gingiva. Ill-fitting crowns and bridges causing irritation of the gums are among the underlying causes of pyorrhea pockets which offer an ideal habitat for septic organisms. Bridges which are not self-cleansing cause infection of the process and secondary infections of the alimentary canal.

In the light of these problems it is stimulating to hear the experience of one who is trying to conquer these problems. The methods which have been advocated have proven that crown and bridge work properly constructed may be classed as actual promoters of health.

We must look at these recent findings with open minds, admitting that they are true, but equally contending that hygienic appliances may be constructed and are being worn by patients who are daily benefited by their use.

ADVICE TO THOSE ABOUT TO WEAR ARTIFICIAL TEETH

BY D. W. BARKER, M.D.S., BROOKLIN, N. Y.

THE ADVICE HERE GIVEN has been a help to others and may be a help to you. You are now about to begin to learn to do something you have never done before—to use an artificial substitute for natural organs (teeth) and, however perfect they may be, they are not equal to the natural teeth, nor are they used in the same way.

Do not expect to acquire facility in the use of these new things at once. That comes only by practice, patience and time. You cannot learn it in a few days, or a few weeks. You will learn it a little at a time, day by day, gradually acquiring command over them. In a month or two you should acquire a considerable degree of skill. Above all, do not become discouraged and get the notion that your experience is in any way different from that of other beginners. All others who wear artificial teeth have to go through this process of self education. The dentist may do his part perfectly, but this is something that you have to do for yourself; no one can do it for you, and unless you do it your teeth will not be a success. You should not allow yourself to get into the habit of leaving the teeth out. To do so is to incur a distinct loss, for no one ever learned to use a set of teeth by wearing them in the pocket or the bureau drawer. You can learn to use them only by using them, just as a child learns to walk by walking, though imperfectly at first.

There are two things that will take you longer to learn than anything else, namely, talking and eating. I will consider them separately. In speaking there are certain sounds that are apt to be more difficult than others; s, x, ch and sh are the worst. A good way to overcome this difficulty is to practice reading aloud. Do it alone so there will be none to attract your attention. Read slowly and make it a point to enunciate each syllable distinctly. When you meet with a word that bothers you, stop and say it over and over until you can say it distinctly. Remember you are training the muscles to obey the will very much as a child does in learning to talk. The more this simple and easy exercise is practiced the quicker you will be able to speak distinctly. Following this plan most of the difficulties of speech will disappear in a few days.

Learning to eat with them will take you somewhat longer, but the principle is the same. Don't expect to eat your first meal with your new teeth just as you did with your natural teeth, nor just as someone else does who has worn artificial teeth for many years, for you won't do it; no one ever does it. I used to know a dentist who would tell his patients not to yield to the temptation to take out their teeth at their first meal and they would not want to take them out the second time. This I consider bad advice, because the patient is apt to become discouraged at his failures, and get the idea that there is something wrong with the teeth or himself. If you become discouraged and lose confidence in your ability, the teeth will not be the success that they should be. Therefore, I would not advise a beginner to try to do too much at first. If you only eat part of the first meal with them you are doing very well. Gradually increase the length of time at each meal, eating slowly, and in a few days with increased confidence and control, which comes by practice, the whole meal can be essayed. Even then you will find you are learning something more every day, and as the days pass an increased efficiency is acquired. If you attempt to bite upon a hard substance, like an apple or an ear of corn, you will probably trip them, for this is a severe strain upon the suction. It may be accomplished, however, by pressing the apple firmly upward against the teeth at the moment of biting upon it. This may be tested with the finger, and it will be found quite impossible to trip them.

Some people acquire a habit (after their teeth have been extracted) of holding a handkerchief over the mouth when in the act of laughing. If you have such a habit you should break yourself of it at once, for the action directs the attention of the observer to the mouth; if you do not make the motion no one will think of looking there.

"Shall I keep them in at night?" is a question often asked by a beginner. To this I answer, "No, not right away, because they would keep you awake. But after you have become accustomed to them you may try it if you think you would be more comfortable. It is just as you find it most comfortable."

If you find that your plate makes a sore spot, usually somewhere along the edge, this is not an indication that the plate does not fit properly, but merely that there is a little too much pressure at that particular spot which should be relieved by filing off a little. Almost all new plates have to be relieved in this way. Return to the dentist while the place is sore (not after it has gotten well) and he will know how much to file it off.

Your artificial teeth should be kept clean. To do this they should be carefully and thoroughly scrubbed with a stiff brush several times a day (after each meal if practicable). A toothbrush is not a good brush for this purpose. A small hand scrub brush is much better.

In conclusion I wish to urge you to give no heed to the teasing or joking comments of your friends. In most cases it has no serious meaning but may arouse dissatisfaction in your mind where no cause for dissatisfaction really exists. To illustrate, I once knew of a lady who returned a set of teeth to the dentist that were perfectly satisfactory, because someone had said that they made her mouth look like Henry Ward Beecher's, and she wasn't going to wear a set of teeth that made her mouth look like Henry Ward Beecher's mouth.

MOUTH INFECTION AS A SOURCE OF SYSTEMIC DISEASE*

BY FRANK B. WALKER, M.D., DETROIT, MICHIGAN

IN THE ECONOMY OF NATURE all living organisms feed and depend for their existence upon each other. In the course of their development and life histories there is a constant struggle for subsistence and of resistance. All animal and vegetable life is unceasing in its change. When an organism undergoes change because of infection with parasites or saprophytes the process of deterioration and of repair constitutes disease. Our exact knowledge of infection is restricted to some diseases of the human family and a few animals and plants, but doubtless every species of life has its infections, a condition of things Dean Swift probably had in mind in the following couplet ascribed to him:

So, naturalists observe, a flea
Has smaller fleas that on him prey;
And these have smaller still to bite 'em—
And so proceed *ad infinitum.*

A study of the sources of systemic diseases discloses some surprising and important observations. An investigation and comparison of the infection atria reveal the fact that oral sepsis is responsible for more diseases of mankind than any other focus in the body. It is incongruous that the medical profession has developed rhinolaryngology, gynecology, dermatology and several other specialties, but for so many years has failed to appreciate the field of the dental surgeon. Doctor Billings is credited with having first understood the relation of systemic diseases and mouth conditions and with having called attention to it thirty years ago. During the last few years Rosenow and others have assiduously cultivated this field bacteriologically and greatly modified the practices of both dentistry and medicine.

Roentgenology also has been a most valuable aid in recognizing alveolar diseases and in checking up the dentists' work. As the X-ray has shown many sprains to be fractures and many fractures to have been allowed to go unreduced and to unite in deformity, so has it shown many teeth with infected pulps to have been crowned and improperly filled. Surgeons no longer treat bone fractures or injuries without the X-ray. Neither can dentists afford to treat alveolar diseases without it.

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*Read before the Michigan First District Dental Society, 1915.

My attention was first called to this subject by Dr. C. P. Wood but more forcibly about three years ago, when I opened a "gum boil" and advised the patient to consult her dentist at once. Not long afterward I opened it again. The patient told me her dentist assured her that her teeth were all right. I had Dr. W. A. Giffen X-ray her jaw and found not only diseased teeth but also considerable necrosed bone. After extraction and curettement the disease was cured permanently. Since than that experience has been repeated several times in other cases. I am convinced now that dentists, as a rule, and doctors also do not appreciate the significance of alveolar disease.

It is not long after birth that bacteria gain admission to the mouth and become permanent residents. They are numerous in kind as well as in quantity. As a rule they are non-pathogenic, but if immunity be impaired in any exposed structures infection will result.

The medical profession iswell informed as to infectious procesess in the mucous membranes of the mouth and in the tonsils but to many the peridental membrane is a borderland, as truly as though it existed outside of the body. We are all aware of the importance of the teeth in the preparation of food, but not as breeders and distributors of systemic diseases.

The role of the tonsil, of the urethra, of the alimentary tract in the spread of disease, is well understood but the gate-way of the body has been, until recently, practically regarded as off the premises.

The care of the teeth is one of the important things to learn. The local Board of Health, under the especial direction of your President, Dr. C. H. Oakman, did a truly great and wonderfully wise thing last Christmas in presenting to so many children the means of taking care of their teeth. It must have made a strong impression on very many people, old as well as young, in favor of mouth cleanliness.

Propaganda of that sort, dental inspection of school children and teaching of mouth hygiene in the schools will soon inform the public of the dangers of neglect. The next generation will undoubtedly have great advantage over the present in this respect.

Meanwhile, for those whose pulps and peridental membranes have become infected through dental caries and calcareous deposits, precise antiseptic treatment will be needed to forestall alveolar infection, osteitis and necrosis of bone. There is a great demand for that kind of dental surgery now and it will increase. The present generation of dentists has a bonanza, but no individual dentist will succeed unless he has a clear concept of his work and does it conscientiously.

With the onset of infection the physician's work begins. Unless good drainage of the primary focus be established there may result extension of the inflammatory process to the adjacent structures, sinus disease and metastatic infections in remote parts of the body.

Dental and medical literature are fast becoming replete with case reports demonstrating these facts. They include adenitis, acne, boils, headache, torticollis, neuralgia, myalgia, arthritis, endocarditis, appendicitis, gastric and duodenal ulcer, infection of the biliary tract, pernicious anemia, and doubtless there will be added many other secondary affections, the associated relation of which to oral sepsis has not yet been observed.

Rosenow has made an important contribution bearing on the vaccine treatment of these diseases. He has observed that the characters of the micro-organisms in the primary and secondary lesions may be different and that in consequence autogenous vaccine made from the primary focus may not contain the proper antigen.

It is not to be taken for granted that alveolar disease is always primary even in the presence of systemic diseases. It should nevertheless be corrected since, as Billings has pointed out, other treatment largely fails so long as there exists an active focus of infection.

The hematogenous character of systemic diseases due to infections and the localization of the infective micro-organisms are facts of tremendous significance. We have already learned to associate rheumatism directly with tonsilitis, alveolar and sinus disease, and believe, as C. H. Mayo has stated, that these infections develop anaphylaxis from the constant poisoning, the results of which are shown in hay fevers, asthmas, urticarias, and other affections.

The relations between the primary and secondary lesions may not be obvious; they may even escape detection by methods known today, but we are convinced that the theory of idiopathic disease is doomed.

I have purposely avoided in this paper the discussion of technical dentistry and mooted points but have sought to bring together such established facts related to the subject as would be calculated to impress you with a sense of its importance and an ambition to make further progress.

High as the Russian birth-rate is, the death-rate has sometimes exceeded it. Nor is it found, as some would-be sagacious persons confidently assert, that the high birth-rate is justified by the better quality of the survivors. On the contrary, there is a very large proportion of chronic and incurable diseases among the survivors; blindness and other defects abound; and, though there are many very large and fine people in Russia, the average stature of the Russians is lower than that of most European peoples.—*Havelock Ellis in Physical Culture.*

THE STERILIZATION OF DENTAL INSTRUMENTS*

BY H. E. HASSELTINE, WASHINGTON, D. C.

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THE POSSIBILITY OF THE TRANSMISSION OF DISEASE from one person to another through the medium of instruments and appliances used in dental operations has long been recognized. Reports of such occurrences are frequently heard from the laity, but authentic reports in scientific publications are practically never published. Few men will deny that such cases do occur occasionally, their frequency, however, is not determinable.

Anyone familiar with asepsis has probably noticed errors in the surgical technic of a dentist, while receiving dental treatment. Among these errors may be mentioned the placing of sterilized instruments on a swinging tray or glass plate which has not been sterilized, the cleaning of burs on a scratch wheel which has not been sterilized since the burs used on the previous patient have been cleaned thereon, and the frequent handling of the cable of the dental engine, which receives contamination from one patient through the operator's hands and in turn returns a portion of this contamination to the operator's hands when used on subsequent patients. These are some of the errors of technic seen personally, and are mentioned here to emphasize the necessity of having everything which comes in contact with the instruments or hands of the operator free from organisms obtained from previous patients in order to prevent transmission of infection from one patient to another.

A sterile towel over the tray, a scratch wheel which can be removed and sterilized with the instruments, and a simple sterile linen covering to put over the cord of the engine would make the operation many times more acceptable to the critic, provided, of course, a fresh towel and covering were used for each patient and the scratch wheel sterilized when each patient vacates the chair.

For improvement of the technic of the future dentists we should look to the dental schools. They all have courses in bacteriology, which, however, in many schools are largely theoretical instead of practical. The morphology and cultural characteristics of various organisms are considered, but their resistance to disinfectants is passed over by noting what certain books say regarding this phase of the subject. Little actual laboratory work is done to show the relative value of the sterilizing agents applicable in dentistry and how their efficiency is tested. As a result the

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*Dentists and dental societies asked the Surgeon General of the Public Health Service to have a detailed method of sterilizing dental instruments worked out, which has been done by Mr. Hasseltine, and this is the result of his work as given in the Hygienic Laboratory Bulletin.—*Editor.*

student forms the opinion that any sterilizing agent is effective, and does not learn to check his sterilization by bacteriological tests. For the coming dentists the improvement should come through the schools. For those already in practice it must come through reading and exchange of ideas among the men of the dental and medical professions.

Realizing the necessity of improvement, some members of the dental profession are striving to bring about better sanitary conditions in the offices of dentists at large; also among their patients, by teaching them oral hygiene. This work is most commendable, and to this end the officers of some dental societies have asked the Surgeon General of the Public Health Service to work out a detailed method for sterilizing dental instruments and appliances, keeping in mind the important factors, simplicity, efficiency and duration of the process of sterilization. As a result of this request the writer was designated by the Director of the Hygienic Laboratory to consider the matter, make experiments, collect data, and make a report thereon.

The process of the work has been interrupted frequently by exigencies of the service and the report much delayed as a result.

THE STERILIZATION OF DENTAL INSTRUMENTS

In considering this subject the writer has endeavored to keep within practical bounds rather than to pose as an idealist.

In testing the efficiency of various methods of sterilization of dental instruments, the consideration of spore-forming organisms has been disregarded. A high degree of heat for a prolonged period is required to kill the spores of spore-bearing pathogenic organisms. Fortunately, the number of such organisms is comparatively few. The vegetating forms of these organisms are killed as easily as are the nonspore bearers. The spore represents a defensive element of the organism against unfavorable influences; that is, though capable of becoming alive, it is apparently in a lifeless phase. Since it remains in the spore stage while in conditions unfavorable for its growth, the spore is easily moved from place to place by mechanical means, thereby increasing the chance of finding a more suitable environment.

By reason of this fact mechanical means of removal of spores from instruments is relied upon. Mechanical cleansing of instruments by a brush or sponge, preferably in running water, will reduce the number of spores so that the number remaining will be too small to consider. For experimental data on the efficiency of mechanical cleansing in the removal of spores, the reader is referred to Francis(1)*.

Such organisms as the pus-producing cocci, the bacillus of typhoid fever, the bacillus of diphtheria, the bacillus of tuberculosis, the *Treponema pallidum* (syphilis), the bacillus of influenza, the amœbae, and the thrush fungus, are known organisms that should be considered. To this list may be added the virus of diseases of unknown or uncertain origin, such as that of measles, scarlet fever, mumps, infantile paralysis and smallpox, all of which seem to be caused by nonspore-bearing organisms.

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*See Bibliography.

Of the nonspore-bearing organisms, the staphylococci are reported to be the most resistant to heat, our most efficient disinfecting agent. On this account various strains of staphylococci were used as the test organisms in the experiments made in connection with this investigation.

TABLE I—SHOWING THERMAL DEATH POINT OF VARIOUS ORGANISMS ACCORDING TO DIFFERENT AUTHORITIES*

Authority	°Influenza	Staphylococcus aureus	Streptococcus	Pneumococcus
Sternberg(2)	60°, 5 minutes	Moist, 58°, 10 minutes. Dry, 100°	54°, 10 minutes.	52°, 10 minutes
McFarland(3)		62°, 10 minutes. 80°, 1½ min.		
Muir and Ritchie(4)		80°, 30 minutes.		
Part and Williams(5)	60°, 5 minutes	80°, 5 minutes	54°, 10 minutes	
Hiss and Zinsser(6)	60 , few min.	58 , 10 minutes. Dry, 90° to 100°	54°, 10 minutes.	52,° 10 minutes.
Jordan(7)		80°, 30 minutes.		
Abbott(8)		62°, 10 minutes.	54°, 10 minutes.	52°, 10 minutes.
Rosenau(9) (10)	60°, 10 minutes.		54°, 10 minutes.	52°, 10 minutes.

Authority	Meningococcus	Typhoid	Diphtheria	Tubercle bacillus
Sternberg(2)		56°, 10 minutes.	58°, 10 minutes.	70°, 10 minutes.
McFarland(3)		60°, 10 minutes.	58°, 10 minutes.	60°, 20 minutes.
Muir and Ritchie(4)		60°, 30 minutes.	60°, 10 minutes.	70°, 1 hour.
Park and Williams(5)	Readily	60°, 1 minute	60°, 10 minutes.	80°, 1 minute.
Hiss & Zinsser(6)	Extremely sensitive to heat.	56°, 10 minutes.	58°, 10 minutes.	60°, 20 minutes. 80°, 5 minutes.
Jordan(7)			55°, 45 minutes.	60°, 20 minutes.
Abbott(8)		60°, 10 minutes.	58°, 10 minutes.	80°, 5 minutes. 65°, 15 minutes.
Rosenau(9) (10)		60°, 20 minutes.	Less than typhoid	60°, 20 minutes.

Table I shows the thermal death point of various organisms, according to different authorities on bacteriology. It was found that the stock laboratory cultures of staphylococci were much less resistant than strains of the same organism obtained from human beings. For this purpose smears from cases of suspected diphtheria or from cases of tonsillitis were used, thereby getting organisms similar to those encountered in the mouth. Mixed cultures were used to simulate the conditions found in nature. In a few cases, *Bacillus subtilis*, a non-pathogenic spore-forming organism, was encountered.

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*The author does not state what thermometer was used, but the degrees of heat given signify the centigrade thermometer.—*Editor*

The resistance of the staphylococci was also tested, when dried on instruments prior to sterilization and when not dried. The resistance was always greater when the contaminated instruments were dry. Consequently the dried infectious material was used in most of the tests.

The physical processes involved in sterilization have been the subject of much research and discussion. It is not necessary to consider here to any extent the theories. They can be stated briefly as the coagulation and hydrolytic theories. The first strives to show that the cell substance of the organism is coagulated by the disinfecting agent, just as the white of an egg is coagulated by heat when cooked. The second theory claims that the death of the organism is brought about by the introduction of water into the cell substance, the consequent hydrolysis being accelerated by the disinfecting agent.

The process of sterilization has been described by Phelps (11) as an increase of the death rate of organisms. But in determining the result of this process there are three factors to be considered, viz.: (*a*) The velocity of the death rate of the organisms; (*b*) the time through which (*a*) is allowed to proceed; (*c*) the number of organisms present. The product of these three factors gives the result. Sterilization is, therefore, a relative result from a mathematical viewpoint and is usually arbitrarily recorded as perfect when the number of bacteria in the volume tested is less than one. On this death rate of organisms, the number present, and the time allowed, depend the efficiency of a sterilizing agent.

However, the exact mode of killing the organisms does not interest the practicing dentist and surgeon so much as does the assurance that all will be killed, in some manner, under certain conditions.

The methods of sterilization employed at present in most dental offices may be classified as follows:

- Thermal
  - Boiling in water.
  - Use of boiling water.
  - Passing an instrument through a free flame.
  - Moist heat in a closed or open chamber.
  - Dry heat in a closed chamber.
- Chemical
  - Carbolic acid, followed by alcohol.
  - Other coal-tar products, followed by alcohol.
  - Formaldehyde vapor in a tight chamber.
  - Other chemicals, such as gasoline solution of biniodide of mercury.

The efficiency of most of these methods was tested, and the advantages and disadvantages of each considered.

BOILING IN WATER

Results of Experiments. Most authorities state that nonspore-bearing organisms are killed by boiling for 10 minutes. A few have reported organisms of this class that have resisted boiling for 30 to 60 minutes, but such are of too infrequent occurrence to require consideration. Of the various strains of staphylococci in mixed culture, which I have tested, I have found none that survived 3 minutes' boiling. This means exposure to water heated until noticeable ebullition takes place before the organisms are placed therein, the time being taken by the watch. Undried instruments were sterilized in 2 minutes. Sterility tests were made by dropping the sterilized instruments into tubes of nutrient bouillon and incubating these for 48 hours at 37°. Though my experiments show sterilization in a shorter time, a period of 10 minutes' boiling is recommended, to provide an ample margin on the side of safety. A small amount of alkali, such as sodium carbonate, or sodium hydroxide, should be added to the water to prevent rusting of instruments.

The advantages of this method are: (*a*) It is the most rapid and most efficient; (*b*) it is always available where fire and water can be obtained; (*c*) the procedure is simple and can be carried out by any one; (*d*) the expense of sterilization by this method is small.

The disadvantages are: (*a*) Dulling of the sharp edge of cutting instruments, such as knives, lancets, etc.; (*b*) increase of effect of action of any chemical impurity in the water upon the instruments, a factor that will vary according to local conditions.

USE OF BOILING WATER

Results of Experiments. If used immediately after the heat is cut off, and in quantity sufficient to guard against a rapid cooling, this method is nearly the equivalent of boiling, so far as practical results are concerned. The use of one gallon of water, boiled until the moment before the instruments are submerged in it, sterilizes as rapidly as does boiling, at least during the first five minutes of exposure. If care be taken to carry out this procedure fully, the method is efficient, the advantages and the disadvantages being the same as with boiling, save that the rapid cooling of the water will necessitate reheating to the boiling point to insure proper results.

The use of water of too low temperature, or for too short a period of time makes possible incomplete sterilization. As the temperature is lowered the period of exposure must be lengthened; but, as the loss of heat is uncertain, the required length of exposure will necessarily be uncertain. On account of the uncertainty of the temperature of the water, except it be boiled immediately prior to use on each occasion, this method is not as good as boiling or the use of a *known* temperature at a degree lower than the boiling point.

PASSING AN INSTRUMENT THROUGH A FREE FLAME

This method is effective, since, if properly carried out, it virtually amounts tc incineration of the organisms. The degree of heat to which the instrument is subjected is much higher than the boiling point, and on this account only a few instruments can be sterilized by this method without interfering with cutting qualities, temper of steel or plating of instruments. It is applicable to certain small instruments whose cost is not high, but is not available for general use.

MOIST HEAT IN AN OPEN OR CLOSED CHAMBER

This is applied by the use of steam in an open chamber (Arnold) or in a tight chamber under pressure (autoclave). Its use for instruments is not very extensive, as the same results can be obtained by direct boiling and some time saved, since boiling a small amount of water requires much less time than heating up a large apparatus. It is of greatest value for sterilizing linens, gowns, towels, etc., and the steam under pressure is preferable, on account of its greater penetration.

DRY HEAT IN A CLOSED CHAMBER

This method is not used for instruments, on account of the high temperature required and the long time required to carry it out. It can be used for glassware or for sterilizing linen, if the temperature be not too high.

USE OF CARBOLIC ACID FOLLOWED BY ALCOHOL

This method consists of submersion of the instruments in phenol of varying strength. The solubility of phenol in water is about 1 part in 20, giving a 5 per cent. solution. This solution is more effective than the pure phenol. After submitting the instruments to this treatment they are immersed in alcohol, to remove the excess of phenol, and then may be rinsed in water, or used without rinsing.

Results of Experiments. With many strains, 10 minutes' exposure to 5 per cent. phenol, followed by one minute in alcohol, sufficed to sterilize. Some strains of staphylococci, however, were more resistant and uniformly gave growth after 15 minutes; in a portion of the tubes even after 30 and 45 minutes' exposure. No strain used survived one hour in 5 per cent. phenol. The same resistant strain was uniformly killed by boiling for 3 minutes. It was also killed by 3 minutes' exposure in an 80° water bath.

Its advantages are: (*a*) The cost is moderate; (*b*) it can be applied to practically every instrument and appliance without damage resulting therefrom.

Among its disadvantages are: (*a*) It requires a longer period of time to sterilize; (*b*) it requires more care in the application of the method (care must be taken to see that all surfaces of instruments are exposed to the solution); (*c*) instruments must be removed from phenol by forceps, as the solution has a bad effect on the skin if the hands are used in it frequently; (*d*) it requires a much better trained assistant, or the attention of the dentist himself, to use this method properly; (*e*) the odor of phenol is, to some, objectionable.

The use of other coal tar products resembles that of phenol in application and efficiency. The advantages and disadvantages mentioned under phenol apply also to these products, except as follows: (*a*) Some have a higher coefficient than phenol, that is, they are more germicidal than phenol; (*b*) some have a soapy composition, giving them the cleansing property of soap when mixed with water; (*c*) their cost, however, is in most cases considerably greater.

FORMALDEHYDE GAS IN AN AIR-TIGHT CHAMBER

This method has, of late years, been very popular among dentists and is efficient, provided a sufficient length of time is allowed for action.

Results of Experiments. Exposure of contaminated instruments to formaldehyde vapor in an air-tight glass jar for periods varying from 10 minutes to 1 hour gave growth more or less constantly. Some strains of staphylococci were always killed by 30 minutes' exposure; the more resistant strains survived for 60 minutes. An exposure of 1½ to 2 hours killed the most resistant strain used. These results were obtained with an excess of formalin in a small glass jar closed by ground-glass joints sealed with vaselin, so the air was filled to saturation with the formaldehyde vapor.

The advantage of this method lies solely in its simplicity and ease of application.

Its disadvantages are: (*a*) The time required to sterilize is too long for a busy dentist; (*b*) formaldehyde causes quite a marked rusting of unplated steel instruments; (*c*) inefficiency is likely to result from the lessening of the density of formaldehyde vapor, unless special care be taken to replenish the supply of formalin solution at frequent intervals; (*d*) inability to remove a single instrument from the air-tight chamber without interfering decidedly with the process of sterilization, because of the lessening of the density of the formaldehyde vapor in the chamber; (*e*) the disagreeable odor and irritating effect on mucous membranes will be experienced more or less by both operator and patient.

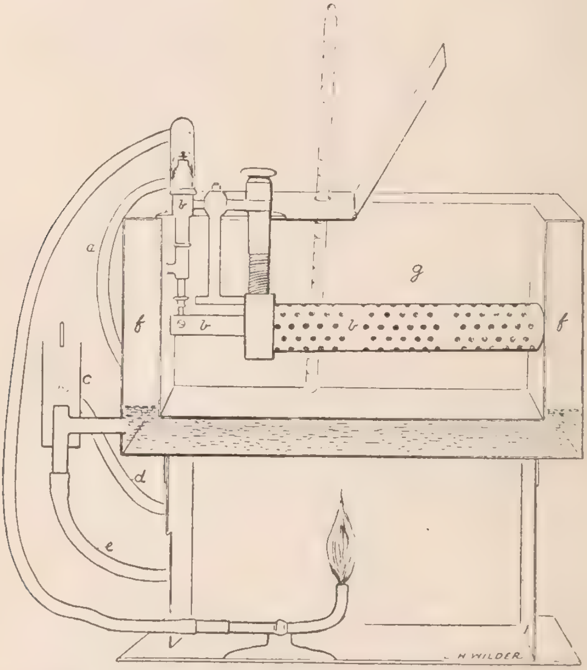
OTHER CHEMICAL METHODS

Disks containing mercuric iodide with some alkaline salt are theoretically practicable. The alkalinity is supposed to guard against the corrosive action of the mercury on the metal instruments. However, this brings a rather delicately balanced chemical reaction into use, and unless the application of the method be carried out by the dentist himself, or an assistant who has some knowledge of chemistry, bad results may be obtained. For instance, the chemical impurities of the water used may vary from day to day, and thus disturb the proper degree of alkalinity. No experiments were made with these disks, as it is not conceivable that their use is an improvement on some of the simpler and less technical methods.

The action of various chemical substances, such as gasoline, petroleum-ether, etc., was tried by the writer. Their efficiency is doubtful and uncertain. No sterilization was obtained except on prolonged exposure (24 hours or more).

In addition to these methods the writer tried the application of moist heat at a constant degree, lower than the boiling point, 80° was the temperature used. This was tried in order to get a method that would interfere less with the edge of cutting instruments than does boiling; also, a method that could be applied to certain instruments that could not be boiled without marked deleterious effect on them, such as dental mirrors.

A jacketed water bath, designed by Mr. W. F. Wells, which was equipped with an apparatus for maintaining a constant level of water in the jacket, was used for this purpose. The inner chamber contains a thermoregulator set at 80°. In this bath the contaminated instruments were placed for varying periods.



To alkalize the water, 0.25 per cent. sodium hydroxide was added. When once raised to 80°, the amount of gas or electric current required to maintain a bath containing 1 to 2 gallons is very small, indeed. In fact, it can be maintained at that temperature for the whole 24 hours cheaper than it can be extinguished and reheated each day.

The use of this degree of heat had no deleterious effect on metal instruments or dental mirrors after prolonged and repeated exposure. Sterilization was always obtained in 3 minutes, even with the most resistant strains of staphylococci used. It is thus seen that this is practically as effective as boiling, but the temperature is 20° lower. It is simple to operate when once installed and is very efficient and rapid.

As stated above, no bad effects were noted on dental mirrors or instruments. However, there was a bad effect on instruments with wooden or hard-rubber handles. But in the present era no instrument that is not entirely of metal has any place in the armamentarium of surgeons or dentists. There are a few exceptions to this rule, where flexibility or elasticity is a factor in the use of the instrument.

From the above experiments and considerations the methods depending upon moist heat were found to be by far the most rapid and efficient.

In order of merit the writer places the methods depending upon heat as the active disinfecting agent as follows:

1. Boiling for at least 10 minutes in 0.25 per cent. sodium hydroxide.
2. Use of water bath at 80° for at least 10 minutes.
3. Use of moist heat in free chamber (Arnold sterilizer) for at least 10 minutes after thermometer reaches 100°.
4. Submersion in boiling water for at least 10 minutes, the source of heat being removed immediately prior to submersion of the instrument.
5. Application of dry heat by passing instrument through a free flame.
6. Dry heat in closed chamber.

The arrangement of the chemical methods in order of merit is much more difficult; in none are simplicity, efficiency and rapidity combined as in some of the methods dependent on heat.

Using formaldehyde, the simplicity is ideal; but the length of exposure necessary to gain efficiency makes it undesirable. With phenol and other coal-tar products efficiency is good but simplicity and rapidity are partially sacrificed. With mercuric iodide, the same factors that militate against phenol, plus a possible deleterious action on the instruments, are applicable.

It is the opinion of the writer, therefore, that in selecting a method for adoption in dental offices the use of moist heat is essential. Some will offer the objection that a dentist has many instruments which will not stand such procedure. I will admit that there are, perhaps, a few instruments which cannot be boiled without an injurious effect on them; but after eliminating hard-rubber and wood-handled instruments, which have no place in any instrument case of the present age, this list becomes very small.

I shall now consider the method of choice as applied to different instruments.

The instruments in the following list can all be boiled without marked bad effects unless the water used has some special chemical impurity which attacks the metal. Such conditions will have to be determined for each water supply and the proper remedy sought through scientific channels.

Broaches and their holders.
Burnishers.
Burs.
Chisels.
Cone-socket instruments with metal handles.
Drills.
Excavators.
Explorers.
Files.
Forceps, extracting.
Forceps, foil.
Forceps, tongue-holding.
Impression trays.
Knives and lancets.
Mallets, automatic and hand.
Mixing slabs.
Mouth gags.
Mouthpiece of gas apparatus.
Mouthpiece of saliva ejector.
Pluggers.
Polishing points.
Pyorrhea instruments.
Root elevators.
Rubber-dam clamps, and forceps for the same.
Rubber-dam holder (metal parts) and weights.
Saws.
Scissors.
Scalers.
Spatulas, metal.
Syringes, water.
Syringes, hypodermic.

The latter should be of glass or metal without washers; they can then be boiled repeatedly without impairing their efficiency in any way. An inferior hypodermic syringe is always unsatisfactory, whether it be sterilized or not.

To the above list I will add the following as instruments that will stand boiling:

Chip blower.
Masks for giving nitrous oxide gas.
Wire scratch wheel for head of dental engine.
Engine hand pieces.

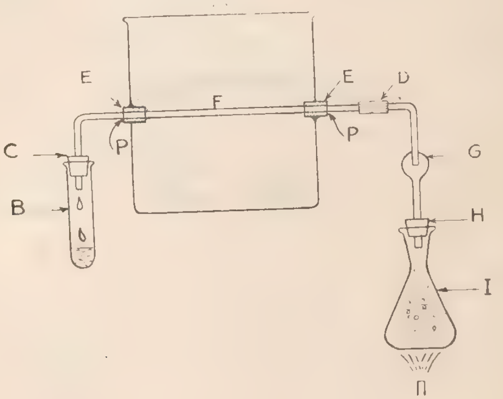
The wire scratch wheel on the head of the dental engine should be made entirely of metal and detachable, so that it can be easily removed and boiled. Probably a cheap bristle wheel might be made that could be discarded after each patient is treated.

(To be continued)

DISTILLING APPARATUS

BY M. M. BROWN, D.D.S., MACON, MISS.

I am sending for THE SUMMARY a crude drawing of an inexpensive and efficient distilling apparatus that any dentist should be able to construct in an hour's time that will answer all purposes where a small quantity of distilled water is needed for any purpose.



A. Galvanized bucket filled with water.
E. Short section of brass or other tubing inserted in holes in bucket and soldered to same.
F. Piece of glass tubing that passes through bucket and sections E, cotton or other packing material being used around tubing as it passes through sections E to make a water tight joint. End of pipe F passes through cork or rubber stopper C which fits large test tube or receptacle to hold the distilled water.
I. Glass flask containing water to be distilled.
H. Rubber stopper.
G. Glass device used in chemical laboratories with round globe that causes a break in column of water and only allows vapor to pass through F where it is condensed.
E. Short piece of rubber tubing connecting tubes G and F.

A CLEFT PALATE CASE.

BY DR. G. B. SPEER, LOS ANGELES, CALIFORNIA.

Under the above heading I have just read an article in the July number of THE DENTAL SUMMARY, giving an improved way of taking an impression of a cleft palate to facilitate the forming of a vellum. I think I have a far greater advanced idea and I am sure the results obtained are so far superior that it would be a farce to compare them.

Let us say Case No. 1, Donald ———, age 22, came to my office November, 1914; had two rubber vellums, was never able to wear either with comfort, in either talking or eating; in fact, could talk plainer without. After examination he followed my directions and went to the Angeles Hospital. Next morning at eight o'clock, I did a Brophy operation. He remained in the hospital one week, went home and reported to my office for removal of lead plates and sutures. He now can talk to strangers and be understood. In his own words, he says he thinks a school teacher can now understand him and he is going to go to night school. He also says people do not notice his lip any more and he can whistle, a thing he always wanted to do but could not.

When I look at this result and I wonder why at this age of human progress and surgical successes, when we can almost say a man's success is only limited by his imagination, for we must remember that he who seeks to discover must first learn to imagine, and the surgeon's hand only does the work guided by the imagination brain, and all that is necessary is to look into that mouth and imagine the shape that palate should be. Then with his hands he constructs out of the tissues already there a palate, shaping it as it should be, true to nature, and as the potter modeling his clay has to allow a sufficient excess to allow for the shrinkage, so we allow for the contractions in the healing, and we have a vellum worthy of the name; and as I pen these few words, there arises in my memory a vision of a kindly face, surmounted by gray hair and I can almost see the kindly eyes and hear the kindly voice of Doctor Brophy, the originator of the Brophy operation, saying that the time for rubber vellums was past years and years ago, and I go further and say there never was a time for them, for surgery should have preceded them, and there would never be need or cause for such an article and rubber vellum, germ-breeding pens would never have been heard of.

Story Building

Man Must Work

Man must work—that is inevitable. He may work grudgingly, or he may work gratefully; he may work as a man or he may work as a slave. He cannot always choose his work, but he can go about it in a cheerful, generous temper and with an up-looking heart. There is no work so rude that he may not exalt it; there is no work so dull that he may not enliven it. But—he must work.—*Ford Times*

MANDIBULAR CONDUCTIVE ANESTHESIA*

BY DR. H. F. KOONTZ, PITTSBURG, PA.

Essentials:

Fischer syringe, 1⅝-inch needle.
Glass jar containing alcohol 60, and glycerine 40 parts.
Porcelain cubic centimeter cup for boiling solution.
Normal salt solution or Ringer solution.
Novocain tablets E and F.
Bunsen or alcohol lamp.
2 E tablets to 2 c.c. Ringer=2% sol.—1 E. 1 F to 3½ c.c.

Technic:

First: Location of external and internal oblique line.

Second: Place index finger so that tip of finger nail is just over margin of internal oblique line, slightly above line parallel with top of teeth. Swab tissues with campho-phenique to remove mucus, then swab with iodin and aconite 5% sol. to sterilize with clean sterilized syringe and needle washed inside and out with boiled water still hot. Then filled with novocain sol. insert needle so (illustrate) past nail into mucous membrane, injecting very slowly 2 or 3 m. as needle travels toward inferior dental foramen—at an approximate point in front of foramen. Start solution going more rapidly constantly moving syringe back and forth, and deposit all of remaining 2 c.c. of solution.

Indications of Successful Technic:

1. Numbness of corner of mouth on that side.
2. Numbness of tongue on that side.
3. Patient says side feels swollen.
4. Try cavity with excavator, then bur, cutting till pain is felt—then proceed as desensitization increases. Always cut from pulp area outward to prevent exposure.

DO N'TS

Do n't:

1. Touch tip of needle with fingers after it is sterilized to see how angle is inclined—wipe it off with a clean piece of gauze.
2. Remove finger after you have located your point on mandible—sterilize nail and tissues both with swab, having syringe sterilized, filled and ready.
3. Carry needle past foramen into soft tissues and deposit solution beyond nerve and expect to get ideal anesthesia.
4. Overlook any point of careful preparation and sterilization, unless you wish soreness, pain and infection.

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*Clinic Odontological Society, Western Pennsylvania, 1915.

5. Boil a Ringer solution 1-4 to 1-3 below its proper proportion and expect ideal results—add the extra distilled water to your Ringer solution when making it.
   One Ringer tablet to 12 c.c. of distilled water and boil down 1-5 after putting in novocain tablet.
6. Use any tablets that are discolored, but

FINALLY, Get a Fischer or other book on conductive anesthesia and *read it.*

REPORT OF COMMITTEE ON DENTAL LITERATURE*

BY A. C. BARCLAY, T. A. HOGAN, J. D. WHITEMAN

IT HAS NOT BEEN THE PURPOSE of your committee to compile an index of all the articles that have appeared in the magazines during the year but rather to call attention to the more important ones, noting the general trend of dental science in its several branches with such comments as our time will permit.

It would be indeed but a casual observer who would fail to note the higher scientific trend of the literature of the present over that of former years.

Those who long have hoped that dentistry would elevate itself and become farther removed from mere craftsmanship must surely feel greatly encouraged through the increasing development of the X-ray in diagnosis, the isolation of the amœba believed to be the cause of pyorrhea and the application of emetin the specific therefor, the fuller realization of the far-reaching effects of infections of the mouth and their consequent significance in diagnosis of systemic disorders has done much toward the recognition of dentistry as an important specialty of the healing art.

We would call attention to the paper entitled *The Responsibilities of the Dentist in Systemic Diseases Arising from Dento-Alveolar Abscess as Illustrated by Peridental Abscess*, by Clarence J. Grieves, in *Cosmos*, April, 1914, and also one on *Mouth Conditions and Their Relation to Public Health*, by V. C. Vaughan, M.D., in THE DENTAL SUMMARY, March, 1915, in which it is stated that through the application of preventive measures the average of human life has been extended from 33 to 50 years, and it is confidently predicted that it will even be ultimately extended to about 65 years. Taking this with the statement of Doctor Bloodgood, of Johns Hopkins, in his paper on *What Every Dentist Should Know About Surgical Lesions of the Mouth and in the Region of the Mouth*, in the *Journal of the National Dental Association*, March, 1915, in which he gives dentistry credit for being the first to practice preventive measures and also that one-fourth of all the fatal cancerous conditions are in or originate in the mouth, and that any sinus in the region of the tooth is a very potent pre-cancerous lesion, and all such sinuses should be made to heal at once.

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*Given at the meeting of the Odontological Society of Western Pennsylvania, 1915.

In the January SUMMARY will be found a most important symposium of papers read before the Stomatological Section of the American Medical Association on *Mouth Infection as a Source of Systemic Disease*, by Drs. Chas. H. Mayo, E. C. Rosenow, C. Burns Craig, Thos. L. Gilmore, and followed by a most instructive discussion, which no one should fail to read. Also *Some Contributions to Dental and Medical Science*, by Weston A. Price, in April SUMMARY, 1914; *The Relation of Pyorrhea to Joint Infection*, by J. Spencer Davis, in *Digest*, March, 1914; and another in SUMMARY; *Pericemental Abscess Associated with Milk-borne Epidemic and Septic Sore Throat*, by Clarence J. Grieves, a paper not only exposing the many hazards of septic oral conditions but also incidentally throwing much light on the unreliability of our present-day root canal work. And still another on *The Dental Aspect of Oral Infection*, by M. L. Rhein, in *Items of Interest*, June, 1914.

From the contents of all these articles, Dr. Chas. H. Mayo's statement that *the next great step in medical science must come through the dental profession*, one must conclude that dentistry is being viewed as having other aims than its traditional mechanical problems and becoming increasingly corporate in its development.

What is perhaps the most important and sensational announcement of the year is that of the isolation of the endamæba buccalis in the last meeting of our state society and reported in the *Cosmos* for August. Simultaneous researches seem to have been made and all equally successful and all three seeming to regard it as the immediate cause of pyorrhea, recommend the administration of emetin locally and internally, as a specific for the disease. Each reported a remarkable record of cures.

To anyone who may have overlooked these articles we would earnestly recommend that they be looked up and carefully read, as much of the literature on pyorrhea of the near future at least will refer to, if not actually be based upon, them, for already there has started what promises to be a perfect avalanche of discussion on this new line of treatment of this disease.

With such an overwhelming preponderance in our current literature, of considerations of the etiology, pathology and therapeutics, and the full realization of the seriousness of septic mouth conditions, may we not take some satisfaction in the fact that when the rank and file of the medical profession and the afflicted public look to us for relief as do the few shining lights such as Drs. Mayo, Bloodgood and others, they will find our lamps filled, trimmed and burning?

Important developments along the line of local anesthesia have been introduced during the year, notably the Fischer method of conductive anesthesia, an instructive paper describing its technic, by E. R. East, will be found in the SUMMARY for September; also one on infiltration anesthesia, by R. H. M. Dawbarn, in *Items* of the same month.

Dr. J. P. Buckley has introduced a formula of modified formaldehyde for the desensitizing of dentin that has been enthusiastically received and promises to be of great value in selected cases.

The following lines were copied from this month's *Cosmopolitan* and contain a moral worth noting:

TOO BUSY TO READ

An hour with a book would have brought to his mind
The secret that took him a whole year to find.
The facts that he learned at enormous expense
Were all on a library shelf to commence.
Alas for our hero—too busy to read,
He was also too busy, it proved, to succeed

We may win without credit or backing or style,
We may win without energy, skill or a smile;
Without patience or attitude, purpose or wit—
We may even succeed if we are lacking in grit;
But take it from me, as a mighty safe hint,
A civilized man cannot win without print.

We beg to submit the following brief resume of the year's contributions to prosthetic literature: The most recent article to which we desire to call your attention is a descriptive and illustrative communication by Dr. Louis Ottofy, Manila, P. I. It is entitled *Dental and Facial Prosthesis in the Philippines.* It describes and illustrates restoration of noses, eyes, ears upper and lower lips and obturators, where diseases had deprived the unfortunates of the aforementioned parts of their anatomy. It is a timely article, and while not dealing with a new subject, it presents it in an entirely new form and impresses us with the great possibilities in this special feature of dental prosthesis—*Dental Cosmos*, April, 1915.

Another paper in this same edition that commands attention is one on *Impression Taking by the Green Method*, by Dr. D. D. Atkinson, of Brunswick, Ga. Doctor Supplee, who is with us at this meeting, has enlarged upon and perfected this system of impression taking, and has added much to our prosthetic knowledge.

A series of articles deserving of more than ordinary attention was written during the year by Dr. John Girdwood, of Edinburgh, Scotland, treating on *Tube Teeth and Porcelain Rods, Their Uses and Adaptations in Prosthetic Dentistry.—Dental Cosmos.*

Anatomic Articulation, by Dr. R. W. Buch, Brown City, Mich., December issue (1914) Dental Summary.

Dr. Alfred Gysi, of Zurich, Switzerland, and Dr. George Wood Clapp, of New York City, contributed a valuable series of articles to the *Dental Digest* on *Masticatory Efficiency in Natural and Artificial Teeth.*

Some Hints Regarding the Manipulation of Anatomic Articulators, by Edward Kenneth, New York City, *Dental Cosmos*, March 1914.

DENTISTRY, IN ITS PROGRESS THROUGH THE CENTURY, TO STOMATOLOGY AS A SCIENCE

BY THE LATE JAMES TRUMAN, D.D.S., LL.D., PHILADELPHIA, PA.

IT IS NOT THE PURPOSE of this article to extend the history of dentistry back to remote times, or even to record its history in the nineteenth and twentieth centuries, for the former has been thoroughly done by Guerini, of Naples, Italy,[1] and the latter has been satisfactorily written by James E. Dexter[2]. The present writer proposes to take over the scientific side of dentistry, at times unavoidably overlapping the practical in its onward progress to the true professional standard.

That dentistry existed in America many years previous to the period the writer has chosen for his opening of a hundred years, needs no statement here. Robert Woofendale, having been instructed by Thomas Berdmore, dentist to George III, came to America in 1776. He practiced in New York and Philadelphia. He returned to England in the course of a few years and, according to Dexter, from that time until after the Declaration of Independence, there was not a "regularly practicing dentist in the country." In Philadelphia on and before 1814 there were fourteen dentists in that city and, doubtless, other cities were equally well represented. John Greenwood was the dentist of George Washington and practiced in New York City. Among the fourteen in Philadelphia in the year 1814, were Gardette, Gilliams, Hudson, Koecker and Van Pelt, all more or less prominent in the midst of a leecher and bleeder class. Hudson, Gardette and Koecker became prominent as the real founders of dentistry in America, especially in operative work.

In the opinion of the present writer, dentistry in the United States had its origin at this time and was quite distinct from that practiced in prehistoric times among the Etruscan people, capable as they were in dental mechanics.

The literature of the first period of twenty-five years, or from 1814 to 1839, was not noted for works of great importance, and none of scientific value. Most of these were small books, more intended to advance the reputation of the writers than to do the same service for the elevation of a crude calling to a higher standard of excellence. Dr. Arthur reviewed these, as a whole, in the *American Journal of Dental Science*, Vol. II., from which the present writer has freely taken to add to his own observations.

One of the books was 1. "A Treatise on Dentistry," by B. F. Longbothom, Surgeon Dentist, Baltimore, 1802. This operator was, without doubt, the first on record as a filler of pulp canals, for, in his book, he recommends the

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(1) History of Dentistry, Guerini, Philadelphia, 1909.

(2) History of Dentistry and Oral Science, 1876.

filling of these when from any cause it is not deemed advisable to extract the teeth. Hudson at this time was performing the same operation, proved yb a bill for such service recently discovered. This evidence is sufficient to prove that root filling was practiced one hundred years in the past. Longbothom also mentions having seen sets of teeth retained in the mouth by atmospheric pressure.

2. "A Treatise on the Management of Teeth," but this is not specially worthy of notice.

3. "A Practical Guide to the Management of Teeth," by L. S. Parmly, Dental Professor, Philadelphia, 1819. He made what he conceived to be an important discovery, that caries was caused by the relics of what we eat and drink being allowed to accumulate, stagnate and putrefy in the interstices of the teeth. This fairly indicates the so-called scientific knowledge of the period.

4. A more important work was that issued in Boston, 1822, by Josiah F. Flagg, M.D., M.S.S., Surgeon Dentist. He attempted to "give in as few words as possible a clear description of the structure and formation of teeth," also a brief sketch of the most common diseases of the teeth.

5. "Principles of Dental Surgery," by Leonard Koecker, Surgeon Dentist, Doctor in Medicine and Surgery, etc., London, 1826.

The author of this book was a practitioner in Philadelphia. His book was not one of marked scientific character, but, for the period, was one of the best on dental subjects. He was the first to mention capping of pulps.

6. "A Physiological Inquiry Into the Structure, Organization and Nourishment of Human Teeth," by J. Trenor, M.D., Dentist, New York, 1828. He denies teeth possess a high degree of organization. The function of the pulp is to deposit layer after layer of bone, the peridental membrane furnishing the nourishment to the teeth.

7. "A System of Dental Surgery," by Samuel Sheldon Fitch, M.D., Surgeon Dentist, New York, 1829.

This is the first systematic treatise on dentistry published in this country. As a detailed report of early procedures in dentistry, it has a certain worth, but beyond this its value consists in ability to make comparison with other methods.

8. "Guide to Sound Teeth," by Shearjashub Spooner, M.D., New York, 1836. This is by far the most important production, in book form, that this period presented. In this Dr. Spooner gives the method of the use of arsenous acid for the purpose of destroying pulps, originating with his brother, Dr. J. R. Spooner, of Montreal. The importance of this discovery cannot be too highly extolled. To it belonged the change from empiric methods to more scientific procedures, indeed, it may be said in truth, that the use of arsenous acid, for pulp destruction, marks the first change from the mechanical side of dentistry to that of pathological scientific culture.

While the foregoing comprises the publications during this first period by American authors, worthy of extended notice, it must be remembered that European writers were endeavoring to teach dentistry by books. The work of Berdmore in England is a notable example and worthy the attention of the modern reader, although it adds nothing to knowledge to be obtained elsewhere.

While the limitations of this essay will not permit extended allusions to any one branch of practice in dentistry, short notices of the changes must be given to meet the ideas involved in this necessarily brief history.

That filling of cavities in teeth was regarded as the only means for their preservation at this stage of dentistry, is beyond question. It was the one important operation. Pulp destruction and the after effects had scarcely been, as yet, seriously considered. This brings us to the process of capping.

Capping, or covering an exposed pulp, was a natural conclusion to be reached. Relieve the delicate tissue from external pressure was the required remedy. The knowledge of infection by bacteria was still in the misty future, although one hundred and forty-three years had passed since Leewenhoek had discovered bacteria in tartar from the human mouth. In the opinion of the early workers, if the pulp could be protected the difficulty would be at once removed. The cap was introduced by Koecker and his method was for many years as the final resort in the treatment of pulps. These caps were made of metal, gold, silver, lead and the dental profession as late as 1854 was greatly excited over the introduction of caps of quill, and this was supposed to be the final word on this practice. The writer in observing personally and reviewing this, cannot resist saying that the supposed science of one day is the folly of the next, and this should make every one cautious to avoid dogmatic assertions as to the great and permanent value of any discovery. Forty years ago some of the best men in dentistry were using caps on pulps and lauding them to the skies, yet today, no one conversant with the rudiments of pathology, would dare to place one on a pulp. Oxychloride of zinc was adopted for this purpose and it had some advantages over the metal procedure, for it acted in a dual capacity of escharotic and antiseptic, but it too fell by the way into the scrap heap of history. At a later period, 1851, Dr. S. P. Hullihen presented another operation, that of drilling a hole through the root of the tooth to the pulp to reduce the congestion of that organ.

There was no research work on caries, worthy the name, during the first period. Dentistry was satisfied to know that decay caused destruction and it was its business to prevent further sacrifice, having no special concern to find the cause. The whole effort of this first twenty-five years, from 1814, was to perfect the mechanical and operative, and, it may be added, that this was quite sufficient for the most active minds. It was not until these processes had, in degree, been perfected, that the reason for the existence of dentists, as professional men, was taken up and seriously considered. Hence caries as a pathological condition of the oral cavity was left to the future for discovery.

It may be said here that Harris, in discussing this subject in his "Principles and Practice of Dental Surgery," fourth edition, 1850, some thirty years later, has this to say upon the subject of "Caries Interna," that seems to have troubled many about this time. The question had been asked: "If caries be produced by external corrosive agents, how is it that the disease sometimes commences within the bony structure of a tooth and makes considerable progress there?" Harris answers this query by saying "that it never does commence there." This might be safely affirmed in 1850, but would not be exactly true in 1914, the reason for which will be given in a later paragraph.

The mechanical appliances and operative procedures must be considered very briefly and only as they apply to dental progress. The plates used to support dentures in the mouth were made either of gold or silver. The porcelain teeth of that early period, as the writer remembers them, were fearfully and wonderfully made. It was a laborious operation for the dental practitioners to prepare the necessary bodies and enamels from very imperfect formulæ, and it took time and patience to carve, bake his blocks and single teeth. Consequently use, and not artistic productions, was the general aim. The single teeth were soldered to the plate and the porcelain blocks, representing bicuspids and molars, were riveted to the plates through holes drilled through the teeth, after biscuiting the body. The plates were narrow, no attempt being made to produce atmospheric pressure. They were required to be mounted with springs. This served a purpose, but were wretched contrivances, subject to constant repair. It may be worth recording, that when the writer was practicing in Germany in 1877, the dealers were holding in stock appliances for adapting springs, discarded by American dentists thirty years previously.

The first years described may, in truth, be called the extracting period, and the time when dentistry emerged from its swaddling clothes. It could not have been otherwise with the ideas then existing as to teeth, in the minds of the general public. Teeth were removed by the key or forceps and then came the unfortunate mechanic with his imperfect work. In the course of years these mechanisms, made to supply the loss of the natural teeth, were perfected to become things of artistic beauty, but the description of these must be left to a later period for consideration. In this first twenty-five years the practice of dentistry was a struggle. It was an individual acquirement. The man who desired to know what some one else had acquired, must pay in dollars, quite sufficient to educate, in fees, the undergraduate of the present before he would be admitted inside of a dental laboratory—all was protected by the greatest secrecy. This fact understood, will explain why it took so many years and strenuous work on the part of Hayden, Gardette, Hudson and others to break this down by organizing societies. Dentistry was a trade and those who carried it on had no idea that the day would ever come when it might be classed as a profession with the doctorate appended. Men were not disposed to give that freely that had cost them hard dollars to obtain, besides much thought and added skill. A broader intelligence was cultivated in later years, mainly through the efforts of liberal-minded men and the influence of what we know now as the supply houses. The effect of these in producing a change in dental thought has not been properly considered. They have been a great factor in developing freedom of thought. Men were forced to come in contact with others engaged in the same work and contact engendered exchange of ideas. This accomplished, the rest was progress. This narrow condition of mind was still in force in Germany thirty years ago, much to the annoyance of dealers who were obliged to make engagements with practitioners in advance, as otherwise no one would purchase material with another dentist present. If the American dentist had not cast this away, the profession, as we know it now, could never have been developed.

SECOND PERIOD

The further consideration of the first period would not be profitable, but it is one of the most interesting, showing as it does, how dentistry emerged from the leecher and bleeder and extractor of teeth, to a higher conception of what his calling stood for at its best. It gives an idea also of the difficulties experienced by these medical trained men, who had essayed its practice to rouse the immature dental minds to broader ideas. Medical art and science has been severely blamed for its action in 1838, in its treatment of Dr. Harris in contemptuously refusing to consider his application that dentistry should be made a part of the medical curriculum. When we consider the condition of dentistry at that time, it would have been almost unthinkable to suppose that medicine would have adopted such a mixed body of mechanical traders and professional enthusiasts. To correctly judge the position of medicine in 1838, these historical facts must be taken into consideration. The writer while he has no word of blame for medicine for refusing to recognise dentistry, must express a profound regret that that course was pursued. It was a great mistake on the part of medicine, as well as unjust to dentistry, or rather to the men aiming at higher things. In the end medicine has suffered financially, for as the years have passed Universities have seen a better light and the enormous classes have helped to fill the treasuries, that might have been the medical schools' right to enjoy. All the dental schools of today are over-crowded and if this is to continue, and there seems no reason why it should not, it will become a serious question how to control it in the interest of the schools and the necessities of the growing population of the country and the world.

The organization of the Baltimore College of Dental Surgery in 1839, must be regarded by the writer as one of our professional misfortunes. It fastened upon us two names that have been a positive detriment and a bar not only to progress, but to the appreciation of a critical world. The writer alludes to the word Dentist and to the degree of Doctor of Dental Surgery (D.D.S.) The word dentist cannot be justly charged upon this college, for it had long been in use, but 1839 should have changed this. As it stands it means nothing more than the care of teeth, when the whole oral cavity is the dentist's province. The degree of D.D.S. is a burden that the dentists of the twentieth century find it almost impossible to eradicate from the list of degrees. If the people dwelling in this world would only realize that a name may make for the future good or ill of a child, college, university, or a profession, time would be taken to carefully consider the possible effects of a mistake and then much trouble would be saved during the lapse of years.

We should have had the word Stomatology, and Stomatologist, as the title of our practitioners, but then Magitot had not in 1839 coined this word from stoma, the mouth, and we have had to suffer and to wait. Even to the end of the third period we were still known as "tooth pullers" by the man on the street, although the forceps had long before been relegated to very exceptional cases. We recognize that the teeth are a very small part of the duties of the oral care taker, important as that care must be to the stomatologist. Dr. H. C. Wood, years in the past, said of the D.D.S. that it represented a partial degree. This cannot be said in truth today, but it still carries that impression to the uninstructed mind. The dental student who earns this degree today has been forced to learn more of the foundation studies of medicine, than the medical undergraduate thought of acquiring forty years ago, yet the same prejudice exists against the D.D.S. This has been made clearly evident the past year, or since the United States determined to place dentists in the Army and Navy. The opposition from the first has been bitter, for the simple reason that dentists insisted, and Congress conceded the demand, that dental men should be rated as equal in their own line of work with medical men, and this gave them equal social standing. The fight is still on and will continue until the title D.D.S. is submerged in that of Doctor of Medicine.

Dentistry was too much occupied in America, at this period, to prepare books and the result is a sparse dental literature. In England, however, the activity was marked, as witness the works of Fox, Bell, Berdmore, Tomes with two volumes, Fouchard, Bunon and Delabarre in France, but in this country no effort was being made toward original research; indeed, as the writer recalls it, and examination of the literature of this period proves, there was, apparently, no ambition to rise above efforts to perfect the practical. That this was necessary cannot be denied and hence no criticism can justly be leveled against the earnest workers of that time.

America was forced to look, as already stated, to Europe for its dental science and especially to England, and those who sought deeper knowledge must extend their examinations beyond the limits of dentistry.

The work of John Tomes, "Dental Physiology and Surgery," 1848, was the most important scientific publication at that time; other books, it is true, were elaborate treatises, but very deficient in original facts. Tomes gives extended explanation of the minute anatomy of tooth structure, the character of enamel, dentin, cementum, etc. He seems to have been in doubt, in this volume, in regard to the contents of the tubes and felt that his microscopic observations had indicated that they might be filled with solid matter.

In 1859 Tomes published another book and in the eleven years between this and his Physiology, he had reached positive conclusions in regard to the contents of the tubes of dentin. In making further observations on this tissue, he says, "I had, however, but little expectation of finding that one of the most important points in dental structure had been overlooked, namely that each dental tube is permanently tenanted by a soft fibril, which, after passing from the pulp into the tube, follows its ramifications."

The present writer duplicated all of Tomes' microscopical work on enamel, dentin and cementum in the early sixties and can testify to the remarkable exactness of all his conclusions. Much has been done since that day to clarify the histology of tooth structure, and it may truthfully be asserted that but little important knowledge has been added to Tomes' work.

Dentistry, at that period, is also greatly indebted to Tomes for all we knew, at that time, regarding dental caries. He says, "Experiments * * * lead to the conclusion that within the mouth agents are present which, under favoring circumstances, are capable of decomposing the dental tissues." He then goes on to discuss the chemical character of the fluids of the oral cavity. Have we advanced much further than this, even with our superior bacteriological knowledge in the year 1914?

In 1869 the present writer wrote on dental caries* and discussed the conclusions of Dr. Leber that the growth of fungi in the cavity of decay acted upon the walls of dentin by penetrating the tubuli in all directions and destroying the continuity of the tissues. In endeavoring to confirm the truth of Leber's investigations on caries, the present writer remarks, in the aforesaid article, that in all the caries examined, without any exception, there was found a dense mass of fungi, leptotrix, and in some cases, oidium albicans. To test and verify the eye examinations, the specimens were repeatedly submitted to the reagent iodine, to detect the presence of starchy matter, with the result of the purple tint in portions of the plant in every case. In the course of time the then conclusions that these fungi penetrated the tubes were overthrown, but the fact of their existence in the carious cavity and having to do, in large degree, with the destruction of the tissue, has never yet been disproved to the writer's satisfaction. This, however, properly belongs to the third period of this history.

Harris contends, in 1850, that caries is the result of external chemical agents. He repudiates the idea, entertained by the earlier writers, that there is anything to support the theory of internal caries, or *Caries-interna*, as it was called. In his opinion "its attack is always upon the external

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**Dental Times*, January, 1869.

surface." This is true in part only. It is true that the attack must be from the external, but this may be by imbibition of the oral secretions, through defects in the enamel not visible to the unassisted vision or through the enamel itself, as demonstrated by Pickerill. One case, in the hands of the writer about this period, proved this; the tooth, a bicuspid, was apparently perfect, not a break to be discovered anywhere by a sharp instrument used on the enamel, and yet the discoloration throughout indicated internal caries. Opening to the interior by drill proved the correctness of the diagnosis. This can only be explained by modern bacteriology, not at that early period arranged with scientific exactness.

During this second period dentistry was in a transition state, 1839, and the College of Dental Surgery, established by Harris in Baltimore, seemed to open a way for a broader intellectual life in dentistry and it was seized upon in various sections of the country as the only and sure road out of the morass it had been plunged into by the refusal of medicine to incorporate the treatment of the teeth as part of the medical curriculum. It, however, meant the solution of many difficult problems. Not the least of these was how to teach dentistry by didactic instruction without the aid of the practical. This had been the method of medical teaching, outside of anatomy, but it was evident some other mode must be established in the curriculum, to have the teaching effective in the practical branches. The result was that the undergraduate in dentistry was at once placed on the human subject to acquire skill in operative manipulations. This has since been modified by the first year of technical instruction out of the mouth.

It is unnecessary here to go over the different chartered institutions of this second period. There were seven established up to the close of 1863. The increase was rapid beyond that date. There is one fact connected with these schools that seems to have escaped notice, that the large number of teachers holding chairs in these were graduates in medicine, that is thirty-four graduates in medicine and nine with the degree of D.D.S. The latter were materially augmented in later years, as for instance in the School of Dentistry, University of Pennsylvania, there are seven Doctors of Medicine, of which three have the degree of Doctor of Dental Surgery in addition to the M.D. One has the degree of D.D.S. and Sc.D. The Assistant Professors show an increase in the degree of D.D.S. There is in this corps one medical, one Ph.D., one M.B. and five with the D.D.S. It will be seen as the writer passes along through the century that the higher training begins to tell.

After the Baltimore College of Dental Surgery came the Ohio Dental College, 1845; Transylvania College of Dental Surgery (never attained importance); New York College of Dental Surgery, 1852; Philadelphia College of Dental Surgery, 1850; Pennsylvania College of Dental Surgery, 1856, and the Philadelphia Dental College, 1863.

It was a slow and almost disheartening process to enlarge the curriculum and the result was that the more intelligent of the graduates in the various dental colleges, finding the teaching was not sufficient for them to meet all the contingencies of practice, sought medical schools for further training. Whether this will be continued may be questioned in view of the present change in preliminary training adopted by a large number of medical schools, practically shutting out all but a small minority of dental graduates.

It was very evident to the more enlightened men of the first period of the century that dentistry could not advance with every man against every other man, and that association was the only remedy. In order to effect this, Horace H. Hayden, M.D., was untiring in his efforts, but such were the conditions of the dental mind that he signally failed to accomplish anything for many years. In 1840 the American Society of Dental Surgeons was organized, with Horace H. Hayden as its first president. The period of this association's life was a stormy one, lasting but sixteen years, dissolved in 1856. The rock of its destruction was amalgam and lack of professional unity and liberality. It, however, did a good work in pointing out the proper direction dentistry must take to be worthy even of its imperfect name.

There was a society formed in Virginia in 1842, but no data are to be had as to its life work.

The Mississippi Valley Association of Dental Surgeons, 1844, proved a very live body. In 1847 it began the publication of the *Dental Register*, which still continues. The motto of this association was, "The sole object, the elevation of the profession, without distinction of persons."

The Pennsylvania Association of Dental Surgeons was organized in 1845 in Philadelphia. Most excellent work of a scientific character was performed by this body in the many years it was under the observation of the writer.

Society of Dental Surgeons, State of New York. No date to be found of the origin of this, or its dissolution.

American Dental Convention, 1855. This claimed to be an open body, but possibly it suffered from too much freedom, with lack of good judgment. It did not flourish very long.

The American Dental Association, 1859. Notwithstanding the period of this organization, just preceding the Civil War, it did a great work and had more influence in molding the dental body into a true profession than was accomplished by any other effort up to that time. Its activity never lessened until it was merged into the National Dental Association, and this belongs to another period.

1844 was a marked era to be remembered for all time by men who love the dental profession. It was the year of the discovery of anesthesia by inhalation, by Horace Wells. It is not the purpose of this essay to enter into the contention, continued from that year to this, as to who discovered anesthesia. Horace Wells announced it at once in 1844; Morton used ether in 1846, and Long claimed that he had used ether in 1843, but in 1844 no one had even heard of Long in connection with anesthesia. The writer would suggest to our medical friends that a new clause in the ethical law might be added, penalizing a member of the profession who keeps to himself any process of value to suffering humanity for more than forty-eight hours. Judging by this standard, Dr. Long must be ruled out of court.

There is one erroneous statement that grew out of Dr. Morton's successful use of ether, that should be corrected. In Dr. Litch's "Anesthesia and Anesthetics," in the American System of Dentistry, he states that the term was first suggested by Dr. Oliver Wendell Holmes; true that he did suggest its use, but Holmes evidently had no idea he was manufacturing an original word, for he expressly states it was used by Linnæus and Cullen, but the idea seems to have prevailed that this word was an entirely new creation. It was a word used to express "sensibility, loss of, by the touch."* The Century Dictionary, 1889, gives the definition: "Anesthesia, loss of the sense of touch. * * * A state of sensibility, especially to pain." The error in regard to this word has been repeated by almost every writer on this subject, including Roswell Park in his "History of Medicine," 1899.

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*"Anesthesia, Loss of Feeling by the Touch, etc.," Bartholomew Parr's Medical Dictionary, Philadelphia, 1819.

(*To be continued*)

A LOOSE PIN BANDED CROWN ESPECIALLY ADAPTED FOR UPPER LATERAL INCISORS*

BY DR. B. A. WRIGHT, LATROBE, PA.

Prepare the root the same as for a Richmond, being certain that you have the enamel removed and not beveled. Fit band and trim to contour or outline of gum. Then remove band, place on end of block of soft wood and place crown in band and swage slightly. The crown should be a trifle larger than the band and ground to a very slight bevel before swaging; then place band on root again, after having ground crown to fit root, and swage again directly against the root. Then remove and if you wish gold partition between crown and root, cut disk to fit about to the center of the band vertically; again replace band and press disk up against root. Take impression, remove, invest and solder disk into band, using as little solder as possible. Then remove and drill hole large enough to receive pin, but not the collar; replace band on root, press pin in up to collar and with sharp pointed instrument outline collar, remove and cut to outline. You are now ready to polish and cement. Having root dried, fill hole in crown with cement and place pin part way, then put some cement on both sides of center disk in band; then fill hole in root and put on the crown and you have a crown as serviceable as any, and in case of repair, easily and quickly done.

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*Clinic Odontological Society, W. Pa., 1915.

A GREAT NATIONAL MOVEMENT

BY W. G. EBERSOLE, M.D., D.D.S., CLEVELAND, OHIO

SECRETARY-TREASURER-GENERAL OF THE N.M.H.A.

WHEN MISS CORDELIA L. O'NEILL, who was then principal of Marion School in Cleveland, presented to the National Dental Association at its meeting in Cleveland, in 1911, and later at the fourth International Congress on School Hygiene, the twenty-seven members of her class as a living demonstration of what mouth hygiene could accomplish, the establishment of a national association was no longer a question. The visible evidence of the physical and mental transformation wrought in those children was greeted by the audience with a demonstration of enthusiasm that will never be forgotten by anyone who was present.

The National Mouth Hygiene Association was formed as an auxiliary of the National Dental Association, July 28th, 1911, in order to unite under one efficient national organization the various oral hygiene working forces of the country. It has already a record of achievement of which both the professional and lay members may justly be proud and which should enlist the interest and support of the entire dental profession.

Among many laudable motives back of this national movement are the following, which appear in the preamble to the constitution and by-laws of the association, as adopted at a meeting in Washington, D. C., last May:

1. The teaching of mouth hygiene and its relation to better health, increased mental and physical working efficiency, and consequent greater happiness;
2. To provide both the expert service and the funds necessary to enable the organized denta' profession in every community to do those things that are for the best interests of its people;
3. To direct the attention of parents and guardians to the importance of dental services especially in childhood;
4. To eliminate the dental fakirs, charletans and fraudulent advertisers who subsist on the ignorance and credulity of the public;
5. To teach preventive dentistry and to recommend the employment of the highest type of professional services;
6. To promote the efficiency of the organized dental profession individually and collectively and to give it a wider, more responsive and more intelligent field in which to work;
7. To bring together actively not only the serious workers in the dental profession, but people of all other professions and vocations, and to enlist their united interest and co-operation in the expansion of the propaganda of preventive dentistry and mouth hygiene;
8. To act as a servant, aid and auxiliary, to both the organized dental profession and the American public, to secure and retain the highest and most permanent benefits for all, through the realization of the objects first stated.

The incorporation of the association under its present title, however, didn't take place until the annual meeting of the National Dental Association at Rochester, N. Y., in July, 1914. It is a corporation not for profit, and exists, as stated in the paragraphs just quoted, for philanthropic ends.

There is no question but that the influence of the association has been one of the chief forces in bringing about a more enlightened public opinion on the subject of mouth hygiene in its relation to public health. The importance of the movement has been fully recognized by national, state and local boards of health, by school boards all over the country and by individuals and organizations interested in social welfare, while many of the leading men of the dental profession have given freely of their time, money and influence.

The responsiveness of the public has been made evident from the very beginning, not only by the interest shown in public dental clinics, but by the private donations for their support—notably at Boston, Rochester and Cleveland. This evidence, together with such encouraging indications as the extensive welfare work under municipal auspices at New York, Buffalo, Philadelphia, Detroit and Cincinnati, show the seriousness with which need of better mouth hygiene is regarded.

The association has from the first been identified with related health organizations. It participated in the Fifteenth International Congress on Hygiene and Demography, at Washington, in 1912, conducted a special session at the Fourth International Congress on School Hygiene at Buffalo, in 1913, and a joint session with the forty-second annual meeting of the American Public Health Association at Jacksonville, Fla., in 1914.

When Mr. Taft was president of the United States, he recognized the association officially, and it has been endorsed by many state and local dental societies and prominent leaders in education, social and industrial betterment and general hygiene. This success of the association has doubtless been largely due to the fact that its founders recognized the need of organization from the outset, and elected a body of officers and a Board of Governors, composed of men and women whose reputation is a guaranty of disinterested and efficient service.

The president of The National Mouth Hygiene Association is Dr. Harvey W. Wiley, the great pure food expert, former chief of the U. S. Bureau of Chemistry. Among the vice-presidents are Dr. Rupert Blue, Surgeon-General U. S. Public Health Service, and now president of the American Medical Association; Dr. W. A. Evans, ex-health commissioner of Chicago, now editor of the health department of the Chicago *Tribune;* Dr. Oscar Dowling, president of the Louisiana State Board of Health, and William R. Malone, president of the Postal Life Insurance Co.

Turning to the Board of Governors, we note such names as those of Prof. Irving Fisher, of Yale University, chairman of the Hygiene Reference Board; Miss Julia C. Lathrop, chief of the Children's Bureau of the U. S. Department of Labor; while Dr. John W. Kerr, Assistant Surgeon-General, U. S. Public Health Service; Mr. Lewis Meriam, Assistant Chief of Children's Bureau of the U. S. Department of Labor; Mr. F. B. Dressler, specialist in school hygiene and sanitation, Bureau of Education, Department of the Interior, have pledged service in research and extension work, and several of the United States Bureaus have been placed at the disposal of the association in promoting its propaganda.

The working methods of the association include extensive campaigns in different cities for the double purpose of community education and the raising of funds, a strong dental publicity department, which secures wide publication of all news relating to the movement and many highly educational articles on mouth hygiene; and active co-operation with the work of allied organizations. One of the great objectives is the establishment of public dental clinics and school clinics in every town and city.

The prosecution of the work is assisted by the establishment of local auxiliaries, the association furnishing the expert service to organize, finance and equip these auxiliaries in a manner which insures definite results and continued self-support, and around which can be centered the work of each community. Auxiliaries have already been formed at Dallas, Texas; Cleveland, Dayton, Canton, Ohio; Washington, D.C.; Portland, Ore.; Kansas City, Mo., and Jacksonville, Fla., and the association is proceeding as rapidly as possible to place these on a successful working and supporting basis.

Many other communities have taken steps toward the establishment of active auxiliaries and may be expected to follow the examples of those already mentioned. Among them are Louisville, Ky.; Joliet, Ill.; Atlanta, Ga.; Duluth, Minn.; Mobile, Ala., and Lynchburg, Va.

It is with a great deal of satisfaction that we call attention to our Department of Extension Lectures, under the supervision of Dr. Edwin N. Kent (Director of Extension Lectures), Boston, Mass., 330 Dartmouth street. This department is prepared to furnish illustrated lectures suitable to the various needs of mouth hygiene workers of the country. These lectures with a set of thirty-two slides, which have been very carefully selected, are supplied to the organizations or communities desiring same at a cost of $2.50, plus express charges both ways, thus making it possible for mouth hygiene workers to have at command this kind of service at a minimum cost. It is evident that the association has undertaken a great task and is prosecuting it with remarkable vigor. Raising the funds for establishing and maintaining such work on a national scale is in itself a large problem.

One of the most important of all meetings of the association was held in the city of Washington on May 29th of this year. Many matters which had been pressing for attention were taken up and measures adopted which will strengthen the organization and extend its usefulness. The work of the officers was recognized by their re-election.

The constitution and by-laws were amended to conform to the laws of the District of Columbia, and to facilitate the completion of the incorporation of The National Mouth Hygiene Association as a corporation not for profit. The principal action necessary to conform to law in this connection was the creation of a Board of Trustees—this board to be fifteen in number. The thirteen members of the existing Board of Governors, including the secretary-treasurer-general, were appointed to this Board of Trustees, the two additional members being the president of the association and the chairman of the hygiene and education committee of the National Dental Association.

It was also necessary to change the formal title of the secretary-treasurer to "secretary-treasurer-general." Further changes in the constitution were made in order to enable the association to carry out its purposes and policies; and a preamble to the constitution was adopted, setting forth these purposes and policies as given at the outset of this article.

The general financial problems of the association also came up for consideration and important action taken which is expected, in time, to result in larger and more dependable sources of revenue for the local and national philanthropic work. Annual dues of active members were raised from $1.00 to $2.00, and new methods adopted for the sale and distribution of Mogene Dental Products.

Many members of the profession are, of course, familiar with the fact that Mogene Dental Cream has for some time been manufactured and distributed under supervision and guaranty of The National Mouth Hygiene Association, with a binding guaranty that that portion of the proceeds of sale received by the association shall be devoted to the national and local philanthropic work in the cause of mouth hygiene.

The association was led to this action for two reasons: First, because it realized that here was a logical and effective means of increasing the funds available for prosecution of its philanthropic propaganda. Second, because it felt the need of a dentifrice which it could conscientiously recommend to the general public and the dental profession as one made under the supervision and guarantee of The National Mouth Hygiene Association. Leading dentists throughout the country had requested the association to do this, for the protection of the general public, who are unable to distinguish between reputable preparations and those containing ordinary commercial chalk, injurious disinfectants and antiseptics or other unsatisfactory ingredients.

The association did not undertake the actual distribution of Mogene, however, until careful study had been given to the subject, and investigation showed that it was feasible to produce a dentifrice of the requisite quality, and to market it successfully. It is eminently just and fitting that the association, which has so much encouraged the use of dentifrices, should derive some support from their sale, instead of having its philanthropic efforts accrue wholly to the private profit of established manufacturers of dental preparations. Nothing undertaken by the association, however, will be antagonistic to the interests of the manufacturers of reputable dental preparations—on the contrary, the success of The National Mouth Hygiene Movement is greatly to their advantage.

Commercial distribution, of course, implies practical business methods, and the plans adopted at the meeting on May 29th will, it is felt, put the distribution of Mogene on a sound and thoroughly satisfactory basis. To this end The National Mouth Hygiene Association authorized its officers to form an organization to be known as the Mogene Laboratories Company, which will manufacture Mogene Dental Cream and also Mogene Tooth Powder, under supervision and guaranty of the association, and distribute them through regular commercial channels by the most efficient methods of modern merchandising.

In addition, the plan for the distribution of Mogene products provides as heretofore for co-operative memberships in The National Mouth Hygiene Association or its auxiliaries, available on payment of One Dollar ($1.00) by any person interested in promotion of the work. In return he receives four full packages of Mogene Dental Cream, which is the regular amount delivered at retail for one dollar. This co-operative package has already shown great earning possibilities to the direct benefit of the local auxiliaries, and should develop tremendously with full realization of the opportunity by all active members. The co-operative package, being distributed at the full retail price through the auxiliaries, can be sold at less "overhead" expense and approximately 50 cents out of every dollar can be applied to the funds available for local work.

It also is of great assistance in soliciting a large co-operative membership—and thus enlisting more and more persons in the cause of mouth hygiene—because the recipient gets back the full value of his membership fee in a dentifrice of exceptional merit, and knows that he is at the same time contributing half the purchase price to philanthropic work. Another important advantage of this package is that it helps the sale of Mogene through the regular commercial channels. Those who are thus once introduced to Mogene almost invariably become enthusiastic users because of its pleasant flavor, entire freedom from grit or other injurious ingredients, and its superior cleansing properties.

The sale of Mogene to the great general public will be prosecuted by the most efficient methods of modern merchandising, especially in cities where the local work of the association is well established. Mogene Dental Cream and Tooth Powder will be advertised to the public, and placed on sale at reputable drug stores and department stores. Each case of one dozen packages will contain a participation certificate to be held by the dealer until collected by the authorized local representative of The National Mouth Hygiene Association or the local dental organization. Return of these certificates to the executive offices of The National Mouth Hygiene Association will entitle the local auxiliaries to pro rata participation to such funds as may be set aside for the purpose from the general revenue of the association. This participation plan has been carefully worked out and should prove to be better than the benefit checks formerly used.

In all matters relating to receipt and disbursal of funds, whether from contributions, sale of Mogene products, or any other source, the association has made it impossible for any of its present or future officers to apply its revenue to any save its recognized philanthropic needs. It is not only bound by its incorporation as an association not for profit, but by a definite guaranty—which has been widely published and is printed on the containers of Mogene products—as well as by contracts with auxiliaries and other local organizations.

To make doubly sure, the association has appointed a National Board of Censors, composed of the following well-known editors representing dental and educational journals and the public press:

Dr. C. N. Johnson, Chicago, Ill., Editor of *The Dental Review.*
A. E. Winship, Boston, Mass., editor of *The Journal of Education.*
Dr. Geo. W. Clapp, New York City, editor *The Dental Digest.*
Wm. C. Bruce, Milwaukee, Wis., editor *American School Board Journal.*
Henry C. Williams, Columbus, Ohio, editor *The Ohio Teacher.*
Dr. L. P. Bethel, Columbus, Ohio, editor *The Dental Summary.*
Frank B. Noyes, Washington, D. C., president Associated Press.

These gentlemen are empowered to examine the books and records of The National Mouth Hygiene Association and its subsidiary organizations. Should they discover any evidence that the association is not carrying out its obligations to the general public and to the dental profession, it is their duty to give such evidence widest publicity in the journals which they represent. The dental profession has every reason to feel confident that the new plans for the manufacture and sale of Mogene products will be of great assistance in realizing the high aims and purposes of The National Mouth Hygiene Association.

In conclusion, I cannot be too emphatic in stating that The National Mouth Hygiene Association is a corporation not for profit, and will continue as the avowed servant of the organized dental profession and the American people in the effort to advance their highest interests and deserve and secure their unqualified support.

Busy Men

"Heaps of folks seem to think Indian summer comes in October. I say it comes in November. Ain't I right?"

"I dunno, and ain't interested. I'm trying to set a lot of people right about the equinoctial storm."

SOME REMINISCENCES*

BY DR. W. J. BURGER, ERIE, PENN.

WORDS ARE INADEQUATE to express the emotions that stir me on this occasion. Here am I, an invited—I will not say distinguished, it might provoke a smile—guest at a banquet of a very representative body of professional gentlemen. Do you grasp the situation?

I was at one time such as you are, a dental practitioner at the head of my profession (in my own estimation) and which, by the way, accounts for my retirement. I was getting suspicious of my prestige and it may be, gentlemen, that in the absence of data to establish my claim to pre-eminence you, yourselves, may harbor suspicions, but from what I am to relate of the way I blossomed out as the latest approved edition of the dental surgeon, and of how I started in to do things, you will be disillusioned.

In the spring of 1855, I started on the first of three consecutive summer tours through the provinces of new Brunswick and Nova Scotia, with the view of combining pleasure and the practice of my profession.

I had qualified myself in my art, to the limit that the then available means permitted. I had mastered Harris' Dental Surgery, at that time the standard treatise on dentistry, but long since consigned to the scrap heap; this, together with the practical knowledge of the art I had in the meantime acquired as a student in a dental office, secured me entree into the profession as a full-fledged practitioner, and having supplied myself with the necessary implements and material, I was off.

Of the many places I visited and the fortune I experienced I will mention only one, a small hamlet on the northern shore of Nova Scotia, reached by a day's journey over a rough, unfrequented road, in a jolty conveyance, built for torture and drawn by an elderly nag highly skilled in the husbandry of energy, with a driver quite as proficient in that direction. His time was chiefly occupied in taking observations of ruts and hummocks (which he seldom missed, as I was made aware by the frequent concussions) and now and then pulling at the reins, with a "get ap, sir," to which the horse responded by a switch of its tail and a toss of its head. It was their way of exchanging civilities.

Impatient of the pace at which we were going, I suggested to him that if our steed could be persuaded into a little livelier gait, I would take the hazard of a catastrophe. Feigning amazement (he was a ponderous joker), he said, "Mister, you don't know that hoss; he goes his gait and don't take no chances. There won't be no kertastrophy where that anermul does the pulling," an opinion I heartily acquiesced in. And so we jogged on with little to break the monotony.

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*Read before the Erie Dental Society, 1915.

From a stretch of upland I was at length treated to a distant, extended view of my prospective haven and its environments, a vision bewitching for its weirdness. Wild, rugged, riotous, its coast line torn and sinuated by the teeth of the sea; and down by the inlet's head, as though marooned there, were huddled the homes of the dwellers, while from away by the headlands came the distant deadened cannonading of the sea.

The wooded hill-tops were ablaze with the light of the retiring sun; shreds of clouds, gorgeous in the lifting sunlight, were speeding across the sky, for it was a windy day, much like one of our strenuous spring days; and waters were breaking rhythmically on the shore and tossing their spray skyward as though saluting, when, jaded, begrimed with the dust of travel, and hungry, I alighted at the village hostelry, a rather quaint-looking affair, with a careworn yet an inviting look—aged and unkempt, but cheery still—its swinging sign creaking and clattering in dumb welcome.

My sign was soon ornamenting the building, the observed of all observers, who had come, as usual, to pass an evening confabulating and cogitating over their toddy, and many were the inuendoes and drolleries they perpetuated at its expense. They held a colloquy on it that evening. So unheard of an incident as the advent there of a dentist took wings. The very next morning an English gentleman called on me. He was in want of a few artificial substitutes, and had been contemplating a journey to St. John's for them, but if I could serve him efficiently, thus saving him the journey, the cost would be no consideration, and so he had dropped in to look me over.

He had his doubts, however, as to my qualifications, and in catechising me on the subject, he did not hesitate to call a spade a spade. Assuming an austere expression, he began firing questions at me point blank. He demanded to know why the devil I was scouring around up in that region hunting for a job if I was a competent dentist. It was a home thrust that for a moment greatly disconcerted me, but pulling myself together, with a look of injured innocence, I said to him, "My dear sir, allow me to disillusion you. I am here for my health. Long and close application, together with the toxic effect of the fumes of the laboratory, were threatening to undermine my constitution, and, by advice of a physician, I am here to get the benefit of the invigorating, ozonic atmosphere of this region. I am no mountebank, sir."

Having thus impressively stated the situation as my imagination had conjured it up, I seized on that psychological nick of time to shunt off onto the question of my professional qualifications, on which I amplified somewhat unctuously, exhibiting for a clincher some specimens of teeth, the perfection of which decided him to favor me with his patronage. What might have been had I explained to him that I was not the maker, and which, in my anxiety to secure his patronage, I inadvertently omitted, is very problematical.

It frequently happens that it is not what one thinks to say so much as it is what he forgets to say "that leads on to fortune." There is frequently a providence in forgetting.

Having taken the impression, I resorted to a nearby smithy, where I ran the dies and swaged the plate while he waited. Returning, I adjusted the plate and took the bite, and dismissed him with instructions to return at five. He was back on time, and presto, the case was in his mouth, fitting nicely, to his inexpressible astonishment and delight.

"How much am I indebted to you, sir?" said he, in his crisp, decided way, after admiring them awhile.

There comes a time in the lives of all of us when the consummation of a dearly cherished wish hangs on decision. His previous assurance that cost was no consideration with him, weighed heavily on my mind. My attention, the entire day, had been pretty evenly divided between my work and the solution of that very problem; I took into consideration the prerogatives of my occupation and the reward of genius, of which my resourcefulness was a contributing evidence. The answer I made him cost me a qualm of conscience, but without a word in comment, he counted out the amount in five and one-pound gold pieces.

By thus tempering my estimate of my professional services to those three considerations, I established a precedent that I feel entitles me to the lasting gratitude of the dental profession.

Gentlemen, I thank you for the kindness you have shown me on this occasion. I am old, but I am not past appreciating social amenities. Age is not unlovely. It stands not aloof from the heart of youth.

I congratulate myself that I was the first president of this society. I postulate its continuance and its usefulness to the profession and the public.

1201 State St.

Extra Hard Work

One afternoon in the trenches an Irish soldier discovered that the man on his right was wearing a beautiful pair of boots.

"How did you manage to get hold of them?" he asked, enviously. "A present from an officer, I suppose."

The Englishman smiled.

"I stole out of the trench last night," he answered, in a whisper, "and I found the boots on a German I killed."

The Irishman became thoughtful, and that night he disappeared.

Early the next morning he staggered back into the trench, carrying a pair of boots. Making for his friend he whispered bitterly to him:

"I've had the hardest job of me life. Had to kill fifty Germans before I found a pair of boots to fit me."—*The Strand Magazine*

MISCELLANY

A CHARGE TO KEEP I HAVE!

BY PROF. D. M. CATTELL, MEMPHIS, TENN.

The Powers that be[†]*—and Gentlemen Graduates* (Addressing the faculty and class.)

IT NOW BECOMES A SAD DUTY and a pleasure to remind you of *many* things we, as a faculty, have gone over carefully and prayerfully with you, reviewing the whole three years' work in a few minutes' time.

It has fallen to my lot to charge you earnestly and positively that you may not lie in your daily walk with mankind.

You were taught from the first day of your school life here with us how to sit and listen to the words of wisdon formulated and expressed for your edification. You were told how to note the more important facts on your pocket slates, and afterwards transcribe and elucidate on the common ledger that you harbored in your boarding house library. We have shown how that receptacle of facts daily added thereto, in time often becomes the foundation of great tomes of information to educate the children of posterity.

We have exhorted you to sit and think over these matters until they have become so emblazoned on the cells of memory that when examinations were held, the answers shot forth so vividly that the respective professors would be delighted—and surprised. We have exhorted you also to read books, other men's books, and then some books.

We have told you how to manage yourselves during college days—taught you the ethics of student life—counseled you not to become a bore to your fellow students, but a pleasure. We have taught you the value of personal cleanliness that you might make a sweet impression on all coming in near contact with you.

You have been told of the importance of the knowledge of the meaning of words that you might shine where others were dull—you have been counseled as to personal appearance when in the presence of your peers—and the ladies. You have been taught that a full dress suit can only be worn after six in the evening, and that a panama hat is ungainly in a rain shower. That "brogans" are not worn at a Senior hop, and that acrobatic stunts are out of place on the dance floor when you have an arm around a lady fair. *Indeed*, you have been taught to impress yourselves favorably on the minds of your instructors that they may come to so believe in you

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[*] A "Charge" delivered to the graduating class of dental students, University of Tennessee, Rogers Hall, June 4, 1915.

[†] University Trustees and the President.

and your attainments that one and all they give you a unanimous pass and recommend, through the Dean, that you are fit subjects to receive from this great state of Tennessee a guarantee of your abilities. And now, gentlemen, on behalf of the faculty I charge you that:

"Honesty is the best policy"
that
"A stitch in time saves nine"
that
"Handsome is as handsome does"
that
"Lips that touch liquor shall never touch mine"
that
"Silence is golden"
that
"The early bird catches the worm"
that
"Haste makes waste"
and that
"Grit makes the man—
The want of it the chump;
They who win, lay hold,
Hang on and hump."

We charge you to locate a field for practice soon; when found to call on your professional neighbors and make yourselves known and felt ethically. We charge you to ally yourselves with some holy church that you may worship God in an approved way, and thereby appeal to your would-be patrons as being a sensible man. You are charged to walk uprightly and not offend your brother practitioners by underbidding or proselyting.

We charge you to walk erect before the young ladies of the community, that they will be attracted by your presence and soon line up for your choosing, one—the best one—as a life mate.

You are charged to marry young that a great and prosperous family may be established. We charge you to be careful in the choosing—remembering that your *success* as a professional man will depend almost wholly on the encouragement and help given you by the chosen one—no jealousies, no spitfire, no incompetency has place at your side and the family prosper.

We charge you to discharge the debts incurred in the beginning of your career, if any—that you may look the world square in the face and show a happy disposition.

You are charged that as soon as your income is one penny beyond the needful living expenses that it be invested in the earth that has till now allowed you to gambol on her surface, unhampered and untaxed. *Buy a farm*, young man, and have a place to play and rest in your old childhood.

And now, gentlemen, you fellows whom we have learned to love as our own, we charge you to be faithful to your calling, to your Alma Mater and to your God. You shall ever be to us as a part of our lives, as a something that still and always will belong to us. We shall watch your career and delight in your success and glory in your greater achievement. May you go hence in peace and God be with you is our prayer.

Ladies and Gentlemen (turning and addressing the audience):

You have heard the epitome of the lessons that have been taught these young men—your sons—your brothers—your sweethearts—you have heard the charge given them—emanating from a body of teachers—a body of men-makers; you have learned of our esteem for them, of our confidence in them, of our love for them. We now introduce them to you and they will mingle among you. What will you do with them? Will you accept them with confidence equal to that which we hold? Will you give them the glad welcome that belongs to a brother? Will you love them as their fond old teachers do? True, we spared not the rod, nor is the child spoiled—had we not loved them we would not have chided.

But enjoy them you will, we know. They are loyal fellows—unsophisticated in the wiles of flattery and sweet words—so I bespeak for them a gentle nursing until such time as they are fit to take the reins of responsibility in "Bungelow-dom." And now, kind friends, one and all let us remove them from the limelight, allowing them to quietly melt away and mingle with the throng—each to work out his own destiny in life. I thank you.

PROPHYLAXIS*

BY DR. FRANKLIN B. ROBERTS, PITTSBURG, PA.

A prophylaxis treatment requires time and in order to give the patient a thorough treatment the fee charged must be in accord with the time necessary to do the work thoroughly. First of all, remove all deposits. A mixture of carmi cleanser, glycerine, a drop of essence of peppermint and, in some cases, a few drops of peroxide I find makes a good paste for polishing. A little rubber cup made by Young & Co., I find excellent for use with the engine. This little cup holds the paste, does not cut or irritate the gum, is soft and not harsh and still removes all stains. The disclosing solution is used after which all surfaces are gone over with the hand polisher and wooden points. For deep cusps the little brush used on the engine is useful. The approximal surfaces can be polished very thoroughly by using the Kuroris silk ribbon smeared with the paste. For the high polish the carmi lustro is used, keeping both tooth and lustro dry. The mouth is now thoroughly syringed with an antiseptic solution and your time is well spent. This treatment, in my experience, I find much appreciated by my patients, and should be repeated every two or three months as the case may be to give the patient the best results.

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*Clinic at Odontological Society of W. Pa., 1915.

EDITORIAL

The Recent Meeting of the Ohio State Dental Society

Did you attend the fiftieth anniversary meeting of the Ohio State Dental Society, December 7-8-9-10, 1915? If not, you missed a rare treat.

"The stellar meeting" was the remark heard on every side. Never has there been such a large attendance; never so much interest and enthusiasm expressed; never a program so replete with splendid papers and clinics. Ohio is proud of her State Dental Society and well she may be.

The addresses, papers and lectures were most excellent presentations and will carry much information to our readers when published.

The Miller memorial unveiling was one of the special features of the meeting and was an impressive affair. The statue is situated near the new library building, on the campus of the Ohio State University, amid a cluster of beautiful trees—a perfect setting for the monument of one who was such a lover of nature.

The memorial was unveiled by Miss Annie Brooks, of Alexandria, Ohio, a grand-niece of Doctor Miller. The assembly then gathered in the chapel of the university and listened to an excellent address by Dr. E. C. Kirk, Philadelphia, a long-time friend and associate of Dr. Miller's. Supplemental remarks were made by Dr. T. W. Brophy, Chicago; Dr. N. S. Hoff, Ann Arbor; Dr. Thos. P. Hinman, Atlanta; Prof. G. W. Knight, of the Ohio State University, who was a college classmate of Doctor Miller's, and by others.

The group of light, short papers presented one after another without discussion between, proved a taking feature Thursday morning. The success of the descriptive clinic idea, when nine descriptive clinics, illustrated with lantern slides, were given before the whole assembly, was so complete that this innovation promises to become a feature of other dental society meetings. It took the place of progressive clinics on the program and proved much more satisfactory than such clinics have in the past. The presentation met with such universal approval that we hope the new idea will be given a tryout by other state dental societies.

The Thursday evening banquet was exceedingly enjoyable and the gems of thought given by the speakers were a rare relish. The out of town men who spoke declared that they had never attended a dental meeting where so much earnestness and enthusiasm were expressed as at this state meeting a nice compliment, surely, for our members.

The after-dinner speeches will be published in connection with the proceedings of the society in The Dental Summary. The miscellaneous clinics Friday were above the average in merit and were a fitting conclusion to the greatest meeting ever held by the Ohio State Dental Society. So much for the general sessions. In the business sessions, the things considered that were of most interest to the profession were:

An appropriation of $4,000 for the Research Institute for the dental profession.

An appropriation of $100 for the special American Hospital in Paris, for wounds of the face and jaws.

An appropriation of $1,000 was placed at the disposal of the Oral Hygiene Committee to carry on its work during the coming year.

The constitution was amended so that component societies can elect alternate directors to the number of regular directors chosen by them.

The three members-at-large elected to the Board of Directors by the state society were: J. R. Callahan, Cincinnati, three years; H. C. Brown, Columbus, two years; L. L. Barber, Toledo, one year. Hereafter one director-at-large will be elected each year to serve for three years.

The oral hygiene and public education committees were combined.

There were about one thousand registered at the meeting, and many more not registered attended. The largest attendance the society has ever had at a meeting.

Dayton was selected as the place for meeting next year. Officers elected for the ensuing year: T. I. Way, Cincinnati, president; F. M. Casto, Cleveland, first vice-president; Z. N. Wright, Dayton, second vice-president; F. R. Chapman, Columbus, secretary; S. D. Ruggles, Portsmouth, treasurer.

Research Institute of the National Dental Association

One of the greatest steps toward the advancement of dentistry was taken when the Research Institute of the National Dental Association was organized. A good work has already been started and the recent purchase of a new building in Cleveland will add greater facilities for investigation so that within a few years the profession may expect results that will materially add to our present limited knowledge about many important dental problems confronting us today.

The new property acquired consists of two buildings containing about twenty-five research rooms and a lecture room. According to an announcement by the commission, research will be conducted in two ways:

"*First*—By making grants to assist special directors who are particularly competent to study particular problems. These men do not receive compensation for their services, but are furnished one or more trained assistants, also laboratory supplies. They are selected with great care and only those are assisted who are so engrossed with their problem that they are already making great personal sacrifices and are also accomplishing valuable results. These men are usually connected with some well equipped institution with good co-operation from allied departments.

"*Second*—The intensive study, in its own institution, of certain large problems where specially trained men will devote their entire time with special equipment selected or designed for their particular requirements. Various workers in the institute will have every possible assistance, such as a complete reference library, at hand; the co-operation of men in allied fields; special clinical advantages and superior equipment. They will receive sufficient compensation to live without otherwise spending part of their daily strength to earn a livelihood. Special facilities will be provided for visiting research men to work on their related special problems.

"Many of the oral and dental problems are so large that they will take long periods of time, with the best possible facilities, to obtain their solution. The tasks before the institute are tremendous, but some can and must be solved. This institution will be to the dental profession and humanity what the medical research institutions are to the medical profession and humanity, and has a particular responsibility and opportunity in being the first and only one of its kind in the world. Its field of service is the humanity of the world."

Some of the problems being investigated or to be studied are: The metallurgical problems of dentistry; dental caries, scientific treating of infected roots of teeth to prevent their reinfection, brown stain, pyorrhea alveolaris, bacteriology of the mouth, baby foods and tooth structures, saliva disorders, facial deformities and accompanying under-mental development, the glands of internal secretions and dental problems, the peridental membrane, systemic diseases resulting from oral infections, including muscle and joint rheumatism, arthritis deformans; iritis and other eye troubles, focal and diffuse kidney infection, blood vessel coat diseases, heart infections, stomach and duodenal ulcer appendicitis, liver infections, skin diseases, nervous system infections, including neuritis, neuralgias, tic douloureux, sciatica and herpes zoster, glandular infections, thyroid, pancreas, lymphatics, etc; pneumonia and lung infections. Also, orthodontia problems, chemical and physical dental problems, root replantations and implantations, etc., will be studied.

Special research rooms will be made available for the use of visiting dentists in which to work on special problems of research that will be of direct help to humanity.

The institute will give advanced special scientific instruction and assistance to members of the dental profession from time to time, on vital current problems. The institute is undertaking a great work that will be watched with interest and should receive the liberal support of the profession generally.

Should our readers desire further information they can obtain it by writing the managing director, Dr. W. A. Price, 8803 Euclid Ave., Cleveland, Ohio.

Special American Hospital in Paris for Wounds of the Face and Jaws

Dr. R. Anema, a member of the Paris committee for establishing a special American hospital in Paris for wounds of the face and jaws, is in the United States appointing sub-committees and soliciting aid for this worthy undertaking.

On account of trench warfare, head and face wounds greatly exceed all others, yet there is no hospital in which these face wounds can be cared for.

The general hospitals are so crowded that the matter of saving life only is attempted. Even if a portion of a man's face is shot away, if his life is not in danger, he must leave the hospital as soon as possible to make room for a new victim.

The result is that many a young man is cast out upon the world with full possession of his faculties, but with so revolting an appearance that people shrink from him on the street. Noses are blown off, cheek bones crushed, upper jaws caved in and lower jaws shot away, but there is no time for treatment except to prevent infection.

The committee states that with a little help from you and other humane Americans, thousands of these young men can be sent back into the world with nothing but a few scars to show. The greatest facial surgeons in the world have contributed their services to a hospital to be established in Paris for the treatment of these wounds. The French war office has offered a suitable building; the American Red Cross will supply disinfectants, gauze, bandages, cotton, and other hospital supplies. It will also give $2,000 in cash when $18,000 has been raised elsewhere, and may be of future assistance.

For each $20,000, the committee can establish and maintain one hundred beds.

Of the American National Committee, H. L. Wheeler, D.D.S., 560 Fifth Ave., New York City, is chairman. Our readers can obtain from him information about sub-committees that are being appointed in nearly all of the larger cities of the United States.

It is a most worthy cause and your contribution, even though only a few dollars, will help. You can send your contribution to the American Red Cross, Washington, D. C. Make your check payable to "The American Red Cross," but be sure to enclose with the check or money order a slip stating that your contribution is to go to the fund for the *Special American Hospital in Paris for wounds of the Face and Jaws.*

OBITUARY

Dr. H. H. Harrison

Henry Hilbert Harrison died at Wheeling, W. Va., December 17, 1915, of stomach, bowel and kidney complication, in the 76th year of his age. In the passing of Doctor Harrison the dental profession loses a member whose efforts and example to elevate the standard of ethics and the profession have seldom been equaled.

He was born April 22, 1839, on a farm near Cadiz, Ohio, his parents, Hezekiah and Lydia (Hilbert) Harrison, having removed there from the eastern shore of Maryland in 1815. They reared a family of five children, of whom only one, David, of Marion, Kans., now survives. His early education was acquired in the schools of the neighborhood, and he later attended Franklin College, at New Athens, Ohio. About 1859 he began the study of medicine, but after about a year decided to take up dentistry and after two years' preparation began practice with his preceptor, Dr. O. S. Lukins, of Cadiz. In 1887 he took a post-graduate course in the Ohio College of Dental Surgery, where he received an honorary degree of D.D.S. In 1889 he removed to Wheeling, W. Va., where he practiced until his death.

Doctor Harrison's greatest activity was in promoting professional organizations. He became a member of the Central Ohio Dental Association May 8, 1866, and supported the motion made at that meeting toward the organization of the Ohio State Dental Society, and his name appears May 21, 1866, in the list of 51 names signing the call for a meeting for this purpose, Dr. C. H. Harroun, of Toledo, being now the sole survivor. While not a charter member of the State Society, he joined in 1867, and was one of the few who effected the reorganization in October, 1884, and one of the incorporators. He was elected vice-president, 1884-85; and president, 1886; member of legislative committee, 1885; committee on district societies, 1889, and member of board of directors, 1888-89-90. Presented several papers before the society and was made an honorary member in 1889. He was active in the organization of the Ohio Valley Dental Society at Steubenville, December 12, 1887, and was its first president. Reorganized this society January 23, 1902, becoming its vice-president.

As with the Ohio State Society, he signed the call for the organization of the West Virginia State Dental Society, and at the organization at Clarksburg, May 5, 1907, was elected president, serving until October, 1908, retiring to become member of the executive council. He was active in the formation of the Wheeling Dental Society, which he served as president; also member of the Odontological Society of Western Pennsylvania, and its president in 1910. He assisted in the organization of the Eastern Ohio Dental Society at Steubenville, April 30, 1914, and was elected an honorary member. Many students enjoyed his preceptorship, among them Drs. D. M. Cattell, of Nashville; A. O. Ross, of Columbus, and the late Dr. J. E. Barricklow, of same city, and P. M. Sharp, of Cadiz.

These activities show how dear to his heart was his ambition to uplift and dignify the profession to which his long and useful life was devoted. In all his social and civic relations Doctor Harrison was ever genial, kindly and ready with sympathy and help. He was a member of the Presbyterian church. His first wife was Miss Mary Hamilton, of Cadiz, to whom he was married in April, 1862, and who died in December, 1872. Of their four His second wife, to whom he was married October 28, 1874, and who survives him, was Henrietta Frances Hall (daughter of Edward and Henrietta) of Washington, Guernsey county, Ohio. Their three children are Virginia, wife of R. A. Gilchrist, of Terre Haute, Ind.; Elizabeth F., wife of Chas. A. Hanna, Montclair, N. J., and Henrietta, wife of H. L. Bodwell, of Vandergrift, Pa.

Doctor Harrison was a Mason. Under the auspices of that society the remains were placed in the vault in Greenwood Cemetery, Wheeling, W. Va., for later interment in the family burying ground at Cadiz.

> "There is no death! What seems so is transition;
> This life of mortal breath
> Is but a suburb of the life Elysian,
> Whose portal we call death."

Edward C. Mills.

Resolutions on the Death of Dr. T. J. Thomas

The committee appointed by the president of the Lake Erie Dental Society at the May 20-22, 1915, meeting to prepare an expression of their sense of the loss sustained by the death of Dr. Thomas, reports as follows:

Whereas, Our Heavenly Father in His divine wisdom has seen fit to remove from the sphere of his earthly labors our esteemed friend and brother dentist, Townsend J. Thomas; therefore be it

Resolved, That this society deeply mourns the loss of one of its most loyal members, one who by his ever cheerful Christian character and royal good fellowship won our warmest affections.

Resolved, That this society extend its heartfelt sympathy and condolence to his bereaved widow and son.

Resolved, That the resolutions be spread on the minutes of this society and published in the professional journals and a copy forwarded to his widow, Mrs. Carrie E. Thomas, 376 Harbor street, Conneaut, Ohio.

G. F. Bell, H. Milton Brown,
R. G. Borland, K. D. Park,
D. E. Kerr, *Committee*

SOCIETY·ANNOUNCEMENTS

Annual Clinic Chicago Dental Society

January 28-29, 1916, Hotel La Salle, Chicago

The annual clinic of the Chicago Dental Society bids fair to surpass in efficiency and enthusiasm our splendid clinics in the past. A notable list of clinicians has been selected and arrangements are under way for a clinic which will place before our guests and members the best in modern scientific dentistry. The evening meeting on Friday, January 28, will mark an epoch in dentistry. The banquet will be held on Saturday evening, January 29.

Reservations for rooms at the La Salle Hotel, Chicago, may be made any time. Banquet tickets may be had by addressing Dr. S. W. Fahrney, 25 E. Washington St., Chicago. The official program will be issued Jan. 1. Exhibitors desiring space may communicate with Dr. L. Strong, 30 N. Michigan Ave., Chicago.

FREDERICK B. MOOREHEAD,
President

Percy B. D. Idler, *Secretary*
30 N. Michigan Ave., Chicago

American Institute of Dental Teachers

The annual meeting of the American Institute of Dental Teachers will be held at Hotel Radisson, Minneapolis, Minn., January 25, 26 and 27, 1916.

There will be a number of interesting papers, reports and discussions by prominent dental educators. All dental teachers are cordially invited to be present.

J. F. BIDDLE, *Secretary.*

517 Arch Street, N. S. Pittsburgh, Pa.

North Dakota Board of Dental Examiners

The next meeting of the North Dakota State Board of Dental Examiners will be held at Fargo, N. Dak., January 11, 1916. For further information address

W. E. HOCKING, *Secretary.*

Devils Lake, N. Dak.

Buffalo Alumni Association

The annual alumni meeting of the Dental Department, University of Buffalo, will be held at the Iroquois Hotel, Buffalo, on Friday and Saturday, February 18 and 19, 1916.

We shall have with us this year Dr. Elmer S. Best, of Minneapolis, who will bring to you an interesting essay and clinic on "New Methods of Root Canal Treatment;" also Dr. Alfred S. Walker, of New York City, who will clinic both days on the following subjects, viz.: "Ionic Medication in Dentistry," and "The Faradic Coil as an Aid in Determining the Vitality of the Pulp."

In addition to the above named clinicians we have several more from a distance and a good array of local talent. All of the exhibit space is taken so you can be assured that the meeting will be up to the standard in this respect.

Don't forget that on Friday evening we shall have our usual dinner and a good social time.

G. E. Jackson,
J. L. Cleveland, } *Business Committee.*
T. A. Hicks,

Washington University Dental Alumni Association

Come home to the "Golden Jubilee" of the Washington University Dental School, February 21st and 22d. The meeting will be held at the Dental School, 29th and Locust streets.

Prominent educators will present an excellent program and the manufacturers' exhibits will be unsurpassed.

I would not pay for riches all their price,
  I want them, but they must not ask too much;
For gold some joys I will not sacrifice—
  Some things I will not do to know its touch.

I would not rob my babies of their right
  To claim my time whenever they may call,
Nor miss the fond caress they give each night,
  And live in thinking gold is first of all.

I would not turn away from all my friends,
  And spend my days in sordid, selfish strife;
Burning my spirit down to yellow ends,
  And just for clinking coin exchanging life.

At times I yearn and hunger to be rich,
  But then come troops of joys that now I hold,
Treasures of love, no single one of which
  I would give up to gain great sums of gold.

—*Edgar A. Guest*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

"The better individual dentist," is the slogan that Dr. Otto U. King, efficient secretary of the National, is carrying far and wide. More power to his elbow. That's the sort of stuff that the profession needs.

Multnomah county, Oregon, is the first to establish a free county clinic.

Elgin, Ill., dentists have organized; will at once co-operate with board of health in establishment of free clinic.

Wichita, Kans., dentists held memorial meeting for Dr. G. V. Black on November 10. His life work was reviewed.

The week of November 15th was "Oral Hygiene Week" at St. Paul, Minn. Both children and grown-ups were included in the effort of the missionaries, and the good gospel was spread energetically and efficiently under the management of Dr E. A. Myerding. During the campaign Dr. J. P. Corley was scheduled for fifty speeches in five days—and that surely is going some, even for a Southerner.

The stereopticon clinics introduced at the recent convention O. S. D. S., for the first time, were an immense success. Think of a thousand dentists viewing a clinic simultaneously, in perfect comfort and with much better effect than possible under old conditions, and you have some idea of the immense stride inaugurated by this innovation.

The Visiting Nurse and Compulsory Medical Examination questions are coming up for discussion in many sections, usually with unfavorable results. In this "Land-of-the-altogether-too-free,"paternalism,even beneficent, is not likely to be swallowed easily. Parents still entertain the ideas that their children belong to them, and that the public has no rights that they are bound to respect.

Trouble is not that dentists do not earn enough, but that they don't keep what they earn. Other men with average dental income would save much more. Too ready to invest in moonshine and blue-sky, as a rule, and have nothing when good opportunities come along.

Dental inspection is now a part of the regular work of the Kansas City Board of Health.

Wise dentists keep their instruments out of sight of patients. What's the use to frighten a patient into the belief that he is about to be killed?

Only seventy per cent. of the school children at Evanston, the aristocratic Chicago suburb, have defective teeth.

Thirty-three of the 536 new men examined at University of Chicago have been pronounced perfect physically, fulfilling every requirement as competitors of Apollo Belvedere. Chicago girls had better take out heart insurance.

Animals have better teeth than men because they chew their food. This hardly applies to dogs, but did you ever see your dog polish his teeth on a bone?

Montgomery Ward & Co., Chicago and elsewhere, have installed dental offices in their various plants, and are serving their employes at cost, without deduction for time lost. Thus far the experiment has satisfied the management that both employer and employe are benefitted.

Seventy per cent. of the diseases in the United States is due to contagion, and 90% of the contagion originates in public schools.

School children of Lexington, Ky., are to have free dental services, at the expense of the Board of Education.

Material for lectures, clippings, etc., will be supplied free of charge, on application to THE DENTAL SUMMARY.

Well! well! Lady wrote her physician to know if he thought her left eye would "sag down in its socket" if her dentist extracted the "eye-tooth" on that side. The M.D. gravely told her it wouldn't! And still we wonder at crime. Jerusalem!

Isn't it about time dentists were making some kind of concerted movement to checkmate the organized gang of thieves that preys upon them? That the gang is a strong one is evident from many circumstances, notably that seldom is an arrest made and, if made, bail is quickly forthcoming and always is forfeited. Why not organize some sort of protective insurance by which the co-operation of all dentists might be enlisted? Fire is the only weapon with which to fight the devil, and why not be about it?

Dr. C. H. Mayo says that often toothache is a symptom of the approach of rheumatism

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

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OFFICIAL ORGAN

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

SUGGESTION AND AUTO-SUGGESTION IN ITS RELATION TO DENTISTRY

BY W. F. STONE, D.D.S., CHATTANOOGA, TENN.

SUGGESTION AND AUTO-SUGGESTION in its relation to dentistry may, at first thought, seem a little far fetched as a subject for an essay upon this occasion; however, if you will bear with me for a little while I will endeavor to dissuade it.

As hours lapse into weeks, weeks into months, and we glide past the milestones of years, we feel the ever-quickening in the grasping of and the dissemination of new ideas and discoveries in our particular branch of science. The true dentist of today is a close observer, is quick of perception, progressive in his ideals and is a hard student in the true sense; he is ever searching the inner recesses of the unexplored for some hidden treasure which he may add to his profession for the benefit of humanity.

My subject is one of which we have heard much and thought little; no doubt a great many of you have never given it one moment's thought, and yet the possibilities of suggestion and the powers of the mind over the body are almost unlimited.

The active cause of the patient's first visit to us is, in the majority of cases, the purpose of obtaining relief from immediate pain, and it is for the accomplishment of this purpose that we spend our first energies. With our present knowledge of cause and effect, used in conjunction with the many drugs which are at our command today, we, as a rule, find it an easy task to relieve the immediate pain caused from a defective dental organ, but it is after this crisis that we encounter our more serious difficulties; to further execute our varied operations without inflicting severe pain upon our patient is the goal for which we are everyone striving. We have for this purpose general and local anesthetics, conductive and infiltrative anesthesia, and numerous and varied other methods which could be enumerated, all of which have great merit but any one of which at times proves valueless. Therefore, since we find any of these agents fallible, I am adding this one to the list, not as an infallible agent for the relief of pain during dental operations, but most certainly as a great help and boon when properly used in a great many cases, and especially during the treatment of the child and the neurotic.

First we will consider the child ranging from five to eight years of age. In a great many instances the deplorable mistake has been made either by the nurse or the parent of having threatened the child when it was a little disobedient by telling it that it would be taken to the dentist and its teeth pulled out if it did not do what was asked of it, which naturally creates a great dread for the dentist on the part of the child; this dread of course, increases with added threats until an overwhèlming fear is created within the child when the time arrives which necessitates a real visit to the dentist; and when the little one is marched into the office it is a very difficult task to dissipate its mental illusions and dispel from its mind the inbred fear of the dentist and his instruments. Practically all of this fear has been created by suggestion; hence, it necessarily must be treated and overcome by suggestion and auto-suggestion. The child is most easily managed when apart from its nurse or parent, provided this can be arranged without too much ruffling of the feelings in the beginning. The next step is to gain the absolute confidence of the child — there is a way — find it; then by suggesting as accurately as possible just what is to happen the child is prepared mentally for what is coming, this mental preparedness preventing the greatest portion of pain, namely, *shock*, which is the natural result every time an instrument touches the patient where suggestive preparation is not used. Always give positive suggestions. Tell the little patient that "this instrument is to clean out the hole in the little tooth," "it will hurt you a little, but you can stand it all right;" "if it hurts too much just tell me and I will stop the instant you tell me to." Then be sure to *keep your word*. "Now we will squeeze the gum over this little tooth for a few minutes, which will deaden it, and it will not hurt when we pull it out;" "now we will pull it out and it *will hurt just a little*, but you can stand it all right." "Now, here it comes." "Now, it didn't hurt one bit, did it?" By positive suggestions of this nature which act on the conscious and are automatically conveyed to the subconscious mind, which in turn assumes control of the physical being, thereby placing the little patient in a state of preparedness under which condition it will more easily undergo the ordinary routine of operative procedure.

By suggestion, or, we might call it "suggestive analgesia," to coin a term, I have been able to handle children—and grown people as well—who could hardly be coaxed into my office for the first time. Usually with the presentation of the little child we receive, *gratis*, the stage of extreme hysteria, and just here is the most vital point of all. Never attempt anything until the little one is at ease, physically as well as mentally. Gain concentrative attention of the patient, even though it requires a laying on of hands; then by forceful suggestion explain what procedure is necessary—then proceed.

Never do more than gain the confidence of the little patient at a first visit. An examination, probably a little pellet of cotton inserted into a cavity, is all that should be attempted at this time. If it is the child's first visit to you and an extraction is necessary, simply look it over thoroughly and determine what is necessary and the method of procedure; then permit the child to go while in a good humor with you, yet with the assurance from the child *itself* that it will come back later in the day or upon the morrow and let you do what is necessary. In this way you gain the confidence of the child, it will believe what you tell it and you will find it an easy matter to control it in the future. Suggesting what is to come, then keeping your word absolutely; never inflicting pain without a previous suggestion of it, is the only way of gaining the confidence of the little patient, and this confidence once accomplished, you can do almost any class of dental operation and the little child will help you through to the limit, provided you do not tell it an untruth.

Next we will consider the neurotic, which is the most annoying class of patients with which we have to deal, and with this class we find the obtunding of pain much more difficult than is the case with the normal individual. However, suggestion and auto-suggestion work to advantage here in just the ratio to which we have gained the absolute confidence of the patient. Just here we must remember first that the conscious mind is in control of the central nervous system and we must shift this control to the subconscious by suggestion. The suggestion that "this will be just a little painful," followed by the counter-suggestion "but it will not hurt you so badly but that you can stand it all right," works through the conscious to the subconscious mind and thereby places sensory control of the system under the subconscious mind, to a certain limit; this limit is at the junction of safety and danger. When we encroach upon a tissue sufficiently to endanger its vitality, the conscious mind again steps in and assumes control and the physical manifestations of self-preservation obtain—*the patient howls.* In this subconscious state the patient will stand a great amount of cutting, grinding, etc., with little knowledge of real pain, the subconscious mind having taken over the guardianship of the sensory nerve stationed at the point of operation.

With the practically normal individual there is not such necessity for suggestive preparation and aid from us in the course of ordinary operations; however, just in proportion to the use we make of suggestion in the handling of our patients we will gain the reputation of being gentle, skilful and successful, all of which are practice builders and the method a real service to humanity.

It is and has been for some years my sincere belief, that the practicing physician who permits a patient to die without having made use of the principles of psycho-therapy in the treatment of the case commits a crime—notwithstanding the fact that this statement is doomed to severe ridicule; however, I am sure ridicule will come from a lack of knowledge upon the subject rather than from any other cause.

We will then analogically concede that the applied principles of psychology is of value to the dentist. Just here Doctor Towner suggests to the patient how to masticate. Ascertain from the patient what foods do not agree with him; then suggest leaving off these foods and the taking of others. In this way we prescribe a diet for our patient, yet he is unaware of it. He is mentally prepared for self-treatment—nothing more nor less than psychotherapy in that by mental preparation of the patient we prevent shock and the pain necessarily incident thereto, thus acting as an analgesic agent; lessens the nervous strain upon the patient as well as the dentist; instils a greater amount of confidence into the patient for the dentist, which necessarily lessens the dread on the part of the patient for the regular quarterly visit which he should pay his dentist every year; and that the principles of suggestion and auto-suggestion should be studied, mastered and applied as far as is possible by every dentist.

DISCUSSION

Dr. A. J. Cottrell: I am glad to hear a paper on this subject presented before a body of dentists and I would like to emphasize the suggestion of the essayist that the principles of applied psychology be taken up and investigated by every practitioner of dentistry. You will find this is one of the most interesting and most valuable things you ever have studied.

I would like to emphasize what has been said in regard to positive statements, and I should also like to make clear something that the paper does not. He speaks of suggestion and auto-suggestion. Auto-suggestion is not in the power of the mind of the dentist.

After considerable investigation of the Christian Scientists, I know they achieve wonderful results. Looking at it from a scientific standpoint, they employ auto-suggestions, first, last and all the time; they accept and use no middle ground. They absolutely deny the existence of all pain whatever. If you will run that statement down to earth, you will find that it means this: that the auto-suggestion is so strong with the Christian Scientist that he will not admit to his consciousness that there is pain. He does not mean that there is no pain, but to him there is no pain—that it is not real. By that he means that it is not eternal. He does not mean it is not material, but that it is not eternal, only temporal, and will pass away. That is a practical point I want to make.

Auto-suggestion and suggestion do not mean spoken words only. Your manner is under the closest observation at all times by your patients, and anything you say, or anything you do is accepted by and taken into his consciousness and acted upon. The prima facia evidence of tha fact is that he has placed himself in your hands, and therefore the point I want to call your attention to, and a point which most dental and medical practitioners know, whether or not they understand the scientific aspect of it, is that you must take care not to make a vicious suggestion. Eliminate such words as "afraid." Don't shake your head. Take for instance, a patient that is sick in bed. The doctor comes in and looks at him, feels his pulse, shakes his head and walks out. What is the result? There is a very vicious suggestion conveyed to the consciousness of that patient, and that is what we—you and I—do every day when we show some slight lack of confidence in ourselves, some fear on our part.

Fear! The slavery of fear! What a wonderful force it has been. We are afraid, eternally afraid of the dark, like a child. We are afraid of something going to happen—that we will get run over by the street car, fall up the steps and break our necks—but we haven't done it yet. If we can keep fear from ourselves and our patients we will have made a great stride. If you have a doubt, don't express it in your face. Act like you were the king of the situation, and that you will be successful, and, as Professor James says, the belief will (in regard to any situation that you desire to bring to pass), your belief, will help you to create the fact, for truly it is often the remaining force needed to shove the wagon up the hill.

When it comes to auto-suggestion, it is simply like a little child talking to himself: "I can do it, I will do it; I can accomplish this; I can control that patient."

There is another thing I want to speak to you about that is very important, and that is what the psychologists call "mental contagion." You have heard of mental telepathy, and know what that means, but the psychologist accepts the idea of mental contagion, and in some way—we do not know how—thoughts do transfer themselves, and you cannot be doubtful, fearful, afraid, without it being communicated to your patient. You have doubtless many times seen this demonstrated. You tell him, "No, that will not hurt," and he says, "Yes, it is going to." So you must practice these auto-suggestions on yourself, and practice these things, master them, and learn to control your own will, to make yourself do what you want to do. When I think of the man who is going through this world following the line of least resistance, I think of the Niagara River that takes the bits of flotsam and jetsam, carrying them in its current and over the precipice.

Listen to Professor James. He says: "Every day do some one or two things that you don't want to do, simply, if for no other reason, to discipline yourself, to learn to govern yourself. That is the main thing." You not only need to know dentistry to climb in life, but you must have confidence in your ability to do things. Why do I say this? Every man has within his own physical nature, and his own mentality, vast reserves of power, of which he is not ordinarily conscious, like a great reservoir which has not been tapped, and when the emergency arises, and by the exercise of his will, he calls for this reserve power, it is at his command. I urge upon you, in taking advantage of these principles, to use them yourself, and then you can use them on your patients. You have seen men under stress of great circumstances do almost superhuman things. A gentleman told me the other day about having picked up the piano, he and his wife, and carrying it out of the fire, at ordinary times an almost impossible thing to do—and yet they did it. If you have trained yourself to thinking positively all the time—I remember one Solomon tells us that as a man thinketh in his heart so is he—you will find that that is not only a religious fact, but a scientific fact, and well worthy of investigation.

I will suggest to you gentlemen that if you wish to find an interesting theme. and one that will help you to control yourself and develop your own character, that you delve a little bit into this subject.

Dr. W. F. Stone (closing): "Good morning, Doctor Cottrell, you don't want to buy any dental plasters?" He has an auto-suggestion in his voice. I didn't want to buy any.

"Doctor Cottrell, I have a new dental plaster here that is the very finest thing ever put on the market. You have never seen it. You can't get along without it." "I don't want it." "But you want to look it over—you will want to buy it, anyway." In a little while auto-suggestion will prevail and you have changed your mind.

Gentlemen, it is a big subject, that will cover a life-time of study, and it can't be covered in a ten-minute paper, which I curtailed, at that; but it will work wonders if you dig into it and study it a little bit, and it will do you more good in the handling of your clients than any other thing you can put in your office, or into yourself.

I did not think so much of it until a patient suggested to me, "Doctor, I like your methods. You always tell me what is coming, then I forget about it, and it doesn't bother me so much until you really do hurt me. I told a friend of mine that that is what I like—I like to know what is coming, and then I am prepared for it." It takes it off the conscious mind, and until you really inflict a severe pain on that patient the conscious mind won't have much control over that body.

It is a big subject, and a subject every man living should study, as it has a big control over our success or failure.

SPLIT MATRIX AND AMALGAM FILLING*

BY DRS. BARCLAY AND MC CREADY, PITTSBURG, PA.

Showed a split matrix of 38-gauge annealed copper, made by punching a hole with the rubber dam punch at point of contact and cutting from occlusal down through the hole to invite tearing and removal of half of the matrix each way, leaving contact with adjacent tooth tight, which is polished at another sitting.

Matrix has gingival corners turned up to prevent ligature, which holds matrix in place, from slipping off gingivally.

A soft soldered band split matrix for restoring partial or entire crowns of teeth, giving mesial and distal contacts with adjacent teeth, was shown.

A demonstration was given of the mixing and packing of amalgam in a sufficiently plastic form to go to every part of cavity under mallet stress, removing excess mercury as it appeared on the surface, after being condensed, using Crandall's hand and mallet condensers and Crandall's alloy.

Cusps are carved and articulation is adjusted and all except contact is trimmed ready for final polish at subsequent sitting.

Stress was laid on using a mortar and pestle and the amounts of alloy and mercury specified by the manufacturer. Also obtaining a complete and thorough amalgamation of every particle of the mass.

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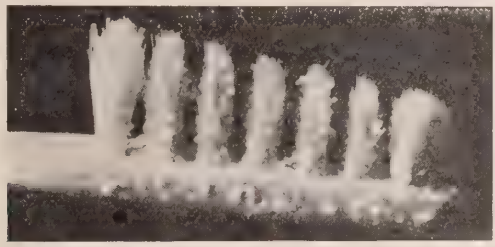
*Clinic at the Odontological Society of Western Pennsylvania, 1915.

HOW TO STERILIZE THE TOOTH BRUSH

BY HUGH W. MAC MILLAN, D.D.S., CINCINNATI, OHIO

A subject which is giving some concern to dentists and laity alike is the proper and efficient sterilization of the tooth brush. That the average brush, due to its unsterile condition, may be a greater hindrance than a benefit to the health of a mouth, is generally conceded. The tooth brush is tolerated because a satisfactory substitute or a suitable sterilizing agent for it has not been discovered.



Most everybody agrees that second to thorough mastication of coarse foods, a sterile brush properly used is the best agent that we can employ for stimulation of the gums and cleaning the teeth. The whole problem is to find a method of sterilizing which can be accomplished quickly and easily without destroying the brush by boiling or strong antiseptics, which will furnish the brush in a dry state preparatory to using, and which will not consume an appreciable length of time in consummating.

After considerable thought for a simple and efficient method of mouth hygiene the following plan seems to solve most difficulties. The patient is advised to keep an approved tooth brush and a salt cellar (preferably aluminum) as his mouth hygiene equipment. After properly brushing his gums and teeth, sufficient salt is sprinkled in a glass of warm water to make a normal salt solution (approximately half a teaspoonful of salt). This is used as a mouth wash. The brush is then held under the running water and cleansed as thoroughly as possible. Salt is then sprinkled upon the brush. The salt is dissolved on the wet brush and penetrates thoroughly to the center of the tufts of the bristles. The brush is then hung in the usual place. When it is again needed, the water will have been evaporated leaving a deposition of salt crystals in and around every bristle. Can you imagine germs living in such environment? Use the brush as it appears, covered with salt, or, if too salty, knock off the excess salt and apply your favorite powder.

This procedure thoroughly sterilizes and toughens the bristles, can be done without loss of time, and provides on the brush an efficient and harmless antiseptic for promoting mouth hygiene.

Andrews Bldg.

DENTAL PATHOLOGY AND ITS RELATION TO SYSTEMIC DISEASE*

BY T. A. LEONARD, D.D.S., NASHVILLE, TENN.

SO MUCH HAS BEEN SAID and written lately on the subject of oral infections and their probable relation to many systemic manifestations and diseases that it seems an opportune time to present to the association a few thoughts on this important subject.

Such a reasonable hypothesis as that implied by the term "Focal Infection" should engage the ready attention of all observers who are interested in establishing the cause or source of certain infections with constitutional symptoms.

Oral pathology is so often confusing and easily misinterpreted by the untrained observer in this field—sometimes as a result of a multiplicity of symptoms, and sometimes from an entire lack of symptoms, or with such veiled conditions as would not be easily recognized. In fact, it would seem that the conditions having the most importat bearing on the subject I am to discuss are those most easily overlooked, because of their lack of symptoms.

For these reasons the dentist welcomes the attention of the earnest medical practitioner to his field of operation and invites his co-operation in every effort to combat the diseases to which these tissues are peculiarly liable and to estimate the responsibility of such foci of infection in their etiologic relations to other diseases.

Accurate observations from the view point of both dentist and physician are necessary to establish clearly any connection that may exist between oral diseases and constitutional symptoms; and for this reason it is important that the specialist and general practitioner should co-operate in securing evidence in order to make safe deductions and reasonable diagnoses.

The reports of Rosenow, Billings, the Mayos and other world-renowned physicians and surgeons, of such men as Grieves, Hartzell, Price and many others in our own profession, are such as to command our attention and compel us to realize as never before the responsibility that is resting upon us.

The prevalence of pyorrhea and alveolar abscesses, the two diseases of which I wish to speak, is such that very few individuals are free from both. It is estimated that ninety per cent. of adults have pyorrhea to some extent, and twenty-five per cent. have dental abscesses.

The association of such diseases as heart trouble, arthritis, anæmias, goiter, appendicitis, etc., with pathology of the teeth and gums is such as to establish them as foci of infection beyond a reasonable doubt.

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*Read before the Tennessee State Dental Association, 1915

Just a few weeks ago I had the pleasure of listening to two excellent papers on this subject by Doctors Billings and Rosenow, in which this is so clearly set forth.

They prove that the same germ is found in the oral cavity that is found in diseased tissue in other parts of the body, and the same germs taken from the mouth and injected into a healthy guinea pig will produce a similar lesion in this animal. Or, to be more explicit, a patient suffering from pyorrhea may develop arthritis; the germ found in the diseased joints is found also to be present in the pyorrhea pockets, and taken from the latter place and injected into a healthy guinea pig will produce arthritis in it.

The germ from certain oral infections when injected into healthy guinea pigs would produce heart trouble, rheumatism or whatever disease the first was suffering from.

According to Doctor Hartzell's report, the streptococcus is found in all mouths and some form of this germ is found in practically all lesions in other parts of the body.

We, as dentists, have in the past attached too much importance to the mechanical side of our work, compared with the treatments of the pathology found and as a consequence we find by the use of the X-ray that teeth that had been comfortable for years have suppurating roots and are veritable culture tubes for the growth of deadly germs. These are the teeth we thought we had "saved." These are the teeth that are causing arthritis and many other diseases of obscure origin.

When an abscess has become chronic it is very doubtful if the infection can be destroyed except by extraction of the tooth or amputation of the root apex.

Doctor Grieves, of Baltimore, in a recent paper, made the following statement: "I wish here to record the statement that there is to my knowledge no medicament nor method germicidal, oxidizing or electrolytic, that will revivify the pericemental apex. If it be vital, the tooth is healthy; if it be necrotic, the tooth is next to be doomed. This is the point where materia medica stops and good surgery begins."

The excision and removal of the root apex, according to the above-named writer, does not assure good results and my own experience and observation would not justify me in recommending it in a large per cent. of cases. Where foci of this kind are associated with constitutional symptoms, it is usually thought best to resort to the more positive method of extraction.

Pyorrhea alveolaris, so-called, is a chronic suppurative disease, possibly the most prevalent disease of mankind, occurring in from 90 to 95% of adults, according to recent reports of investigations along this line.

The predisposing causes of pyorrhea are any irritants or injury of whatever nature which impair the integrity of the gum margins and may be deposits of tartar, poorly fitted crowns, improperly finished fillings, impaction of food between the teeth, irregular teeth, etc. Many theories have been advanced as to the organism causing pyorrhea and most conspicuous among these now is the amœbic theory, but to my mind there is still a great deal of doubt as to the proof of this.

It is true that in all cases of pyorrhea the amœba is found, but is equally true that in a great or greater number of cases you find the streptococcus in some of its forms.

While this disease progresses slowly, it eventually destroys the attachment of the teeth, causing their loss. Probably more teeth are lost this way than by all other causes combined. More serious even than the loss of the teeth is the menace to the health and life of this chronically suppurative disease.

The frequency with which pyorrhea is associated with pernicious anæmias, and other anæmias of obscure origin, is highly suggestive of the role which this infection may play in these baffling diseases.

In view of the fact that so large an area is involved in this suppurative process, the great wonder is that we have been so long in attaching to it the importance it deserves. The area involved varies from four square inches in mild cases to eight square inches in the more advanced cases, and each fraction of an inch teeming with millions of such germs as pneumococcus, streptococcus, staphylococcus, typhoid bacillus, colon bacillus, etc.

In view of the fact that we find so many with these infected areas in their mouths, and have to come to a realization of the importance they play in the health of the individual, something ought to be done to eliminate them and also to prevent their occurrence; and what shall this be? *Oral hygiene* is the secret of good health. This port of entry must be watched more closely. The oral cavity must be kept in an aseptic and healthy condition if the health of the individual continues. Lack of use renders the teeth and gums more susceptible to disease. We use too many prepared foods. We hunt for the tenderest of foods, those that do not have to be chewed. Grind the food in the mouth and the teeth will be firmer in the mouth and in a healthier condition and the stomach will be relieved of the greater part of its work.

Faulty nutrition is due largely to oral conditions. Examine the reports of physicians who examine our school children and you will see how true this is. Five times as many germs go into the lungs by the mouth as through the nose. A much greater per cent. get into the stomach by this channel. Tubercular troubles in the glands of the neck are claimed to be due to infected tonsils, carious teeth, or infected gums. Pneumonia is another disease due largely to conditions of the mouth.

And here I want to say as emphatically as I can that I do not believe any patient ought to be taken to the operating room without first having his mouth as thoroughly disinfected as is possible. Where there is urgent immediate need for the operation, pus pockets around the teeth should not be disturbed by instrumentation, as in this way you only create an open wound for increased infection where this protective wall of leucocytes has been broken down.

It is preferable to operate on the mouth from ten days to two weeks before subsequent surgery is necessary. Otherwise sterilize as thoroughly with antiseptics as it is possible to do, and for this there is nothing better than iodin.

The tubercle bacillus and the pneumococcus are known to exist in carious teeth for forty days. Oral hygiene is important in stamping out such diseases as scarletina, typhoid diphtheria, etc.

At present, it is the opinion that the condition of a person's mouth is his own private affair, but the time is coming when a dirty, germ-infected mouth will be considered a menace to society, as is now a patient with small-pox. And I will close with this thought, that the condition of a person's mouth is not only of importance to that person, but is a matter of moment to the community at large; that an uncared for mouth is not only a source of disease to that individual, but also a menace to the health of every person who comes within reasonable distance of him.

When viewed in this way it can readily be seen that the condition of your mouth is not only your business, but my business, and everybody's business; it is the business of the community.

What Food Makes Good Teeth?

Good milk will, for it makes teeth for calves. Good meat will, for it makes them for young lions and wolves. Good vegetables, nuts and fruits will, for it makes them for monkeys. Good corn, oats, barley, wheat, rye and, indeed, everything that grows, will make good teeth, if taken in their natural state, no elements being taken out, for every one of them makes good teeth for horses and cows.

But starches and sugars and lard and adulterated foods will not make good teeth; therefore a wise mother will keep from very young children pastry, white bread, cakes and tea, and will give them instead good milk, whole wheat bread, cereals, meat, eggs, ripe fruit, vegetables and nuts, and will do well to see that these helps are given them early enough.

The expectant and nursing mother should remember that the duty of giving her child useful and strong teeth devolves upon her.

Without good teeth there can be no thorough mastication; without thorough mastication there can not be perfect digestion; without perfect digestion there can not be proper assimilation; without proper assimilation there can be no nutrition; without nutrition there can not be health, and without health what is life worth? Hence, the importance of the teeth.

The human mouth presents most favorable conditions for growth of germs if remnants of foods are allowed to remain, the moisture and the natural warmth being exactly suited to their development. A germ-laden toothbrush is a menace to the health of gums; it should be kept thoroughly clean, and often renewed.

CORRELATING CONDITIONS COMMON TO NOSE, THROAT AND ORAL SURGERY*

BY E. B. CAYCE, M.D., NASHVILLE, TENN.

IT HAS BEEN SAID that this is the age of specialization, and the warfare against disease, both preventive and remedial, will not be most effective until the internist, surgeon, gynecologist, dermatologist, genito-urinary, eye, ear, nose and throat specialist and the dentist combine their efforts and interests in this warfare for the elimination of infection.

As regards anatomical relationship the work of the dental surgeon and ear, nose and throat surgeon is closely allied as their fields lie within the same cavity and are supplied by the same nerves and blood vessels.

We are coming to see more clearly all the time from observations of such men as Doctors Billings and Rosenow, in their work along the line of focal infections, the importance of examining thoroughly the gums and alveolar processes in searching for the focus of infection, at the same time the tonsils and sinuses and middle ear are being examined for the same. Doctor Rosenow says that a radiograph is necessary before we can say positively that alveolar processes are not harboring such a focus.

The cause of infection must be removed, whether by the dentist or by the medical practitioner, either general or special.

MOUTH BREATHING

One of the most frequent causes of conditions in the correction of which both dentist and ear, nose and throat surgeon play a part, is *mouth breathing*. This most generally occurs in children who have hypertrophied adenoid tissue in the epi-pharynx, which, if uncorrected, later on produces the results so often seen, namely, a narrow arch, high palate, protruding teeth, shortened upper lip, contracted, undeveloped nose.

The time to remove hypertrophied adenoid tissue is when it first begins to give symptoms. In reply to the statement so often made "that the adenoids will *disappear*," we would say that it is true they atrophy to a great extent about the age of fourteen to sixteen, and the posterior nares will become larger, so that the nasal stenosis is less apparent, but you have, as sequellæ, often times many disfiguring results, among them the malocclusion of teeth, which requires time and patience to rectify, if it can be done at all.

Another late result of adenoids is the pathology in the nose, such as deviations of the septum, which is explained by the fact that the nose is the last part of the face to develop, and the nasal septum is turned from its natural course by the abnormally high palate. It seeks the way of least resistance and you have either a thickened septum or one deviated on one or both sides.

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*Read before the Tennessee State Dental Association, 1915.

TONSILS

In connection with the adenoid we naturally think of the tonsils and these are of special interest to the oral surgeon as it is impossible to have a healthy mouth with infected tonsils. They should be looked after closely in any case of pyorrhea alveolaris, or where teeth show a too rapid tendency to deteriorate.

As a matter of interest I will now quote you some figures made from examinations of 53 tonsils from whose crypts smears were made and these compare closely with infections reported from investigations in pyorrhea alveolaris.

In a series of 53 cases in the last three months we have found that 50 cases where the smear was positive were staphylococcic and only 13 *single* infections—18 cases of streptococcic infections with not a single pure culture.

CASES	
6	Staphylococcus Pyogenes Aureus.
6	" " Albus.
4	" " " Et Aureus.
7	" " " Et Streptococcus Pyogenes.
6	" " Aureus Et Pseudo Diphtheria.
4	" " " Et Streptococcus Pyogenes.
1	" " Albus, Streptococcus Et Pseudo Diphtheria.
1	" " " Et Bacillus Pyocyaneus.
1	" " Aureus Et Diploccus Pneumonia.
1	" " " Streptococcus Et Bac. Pyocyaneus.
5	" " " " Et Pseudo Diphtheria.
1	" " Albus Et Friedlanders Pneumobacillus.
1	" " " Et Diplococcus Pneumonia.
3	" " " Et Pseudo Diphtheria.
2	" " Aureus, Streptococcus Et Pneumococcus.
1	Streptococcus Pyogenes, Diplococcus, Pneumoniæ, Et Pseudo Diphtheria.
1	" " " "
1	Pseudo Diphtheria.
1	Staphylococcus Pyogenes Aureus, Streptococcus, Et Leptothrix Buccalis.
—	
53	

THE ANTRUM OF HIGHMORE

Now we come to speak of the most frequently infected of all sinuses of the nose—antrum of Highmore—because of its size and the location of its os, as well as frequency of infection through the alveolar processes.

It is generally claimed by authorities on rhinology that only a small percentage of infected antrums were of dental origin, but my experience since I have been having a radiograph in every case of infected antrum, has shown me that a very large majority are of dental origin.

It is useless to open and drain an antrum if you have infection from the teeth, and especially is this true when infection occurs around the second bicuspids and molars. I do not feel that any man is justified in operating on an antrum without a radiograph.

In closing we would urge a closer relationship among us, the dentist informing himself more as to general medicine and the internist and surgeon realizing more and more the influence of oral sepsis, thereby bridging over the gap that is fast disappearing between dentistry and medicine.

DISCUSSION

Dr. W. J. Morrison, Nashville, Tenn.: I think we have men here more competent to open this discussion. I have had little or no experience along this line. I have read a good deal about diagnosing these cases with the X-ray machine. I noticed in one of the journals not long ago that a doctor who had a case, ordered five teeth removed that he said showed infection. The dentist did not want to remove them without the diagnosis being verified, and he referred the case to another specialist. Upon his examination he found that only two teeth had any symptoms of infection. I would certainly like to have some discussion from gentlemen who use this system for diagnosing, as to how sure they can be in making a correct diagnosis with the X-ray.

Dr. J. A. Gardner, Memphis: I don't like to be on my feet so much, but I think this one of the most excellent papers, the most timely papers, that we will have the pleasure of listening to for a good many years. This is a subject that has been needed more than anything that has been produced in many years. It is a thing that will lead to better results, and will be of a greater benefit to humanity than anything, I believe, that could be discussed—the relation of the dental surgeon to the nose man.

Not long ago I had a patient come to me, and I did quite a bit of work in his mouth, and noticed no pathology in his mouth whatsoever. He went to a nose man soon after I had finished his mouth, and he had what he called his "anthrysis" irrigated, and he came to me and told me that he had considerable soreness in his first molars above. I asked him how long those large amalgam fillings had been in his teeth, and he said about twenty-five years. I asked him how long he had had what he thought was catarrh of the nose; he said about twenty-five years. I immediately called up the nose specialist and asked him if he did not think it would be well to have a radiograph, that I found considerable soreness by percussion on the first molars above, and I understood that he was irrigating the maxillary sinus. He answered me (and he is a first-class specialist) by saying, "Doctor, do you want the patient?" I said, "No, I fortunately have had the patient some little time; not as long as you have, however. You have had him about twenty-five years, and have lived pretty well off of him for that length of time" (he was a pretty wealthy man), "and I think it's about time the dentist was getting a little slice of the pie, but my real interest is to see if we cannot help this gentleman. He is a friend of mine and I mean no offense whatsoever in trying to bring you in close touch with the dental profession. I only want to help my friend, and you may have the radiograph made and see if there is not some trouble with those two teeth. They may puncture the floor of the antrum. If so, I would advise their removal." So he says, "Yes, you can have it made, or me, don't make any difference —anything you suggest." The patient returned to the nose specialist and asked him if he thought there was anything the matter with those teeth. "Do they have any relation to my trouble?" "Not a bit more than your toe nail," said the nose specialist. But he had a little more confidence, strange to say, in me than he did in this nose specialist, so he dismissed him and he came back. I went into those teeth, and went right up through a wide-open canal; the nerve had been extracted before the root had been fully developed and left a large canal, and both of them were infected. So they were removed, and thoroughly curetted, and the patient got well. Now that man had been all over the country; to a specialist in New York, to a specialist in Boston and Philadelphia. He had spent something like ten or fifteen thousand dollars in having his antrum and frontal sinuses curetted, his ethmoid cells also curetted, and with no results. Now, I don't believe, as insignificant as a dentist is, any specialist can get along without him, and I believe that paper would be an excellent contribution to the eminent practitioner of the nose; and I would like very much for the doctor to read it down in our section.

There is one point that he did not bring out that I have had a little experience with, and that is this: We often have infection from the frontal sinus infecting the antrum and the pulp of the first molar, that is, penetrating the floor of the antrum, or close to the floor of the antrum. This antrum is curetted, the pulp is exposed and dies, and a putrescent pulp is left in those teeth, the roots of which are puncturing the floor of the antrum. They treat the maxillary sinus and the frontal sinus; they don't take a radiograph, they don't refer the case to a dentist This happens so often. I believe if we can just bring about that co-operation between the nose man and the dentist we will do more for humanity in that one act than anything that we can do. I believe that there is nothing that is so beneficial in diagnosis as the X-ray. It has come to stay; it is a wonderful aid. There is nothing that we can so positively rely upon as the X-ray.

Now, just one thought and I will quit. There is another proposition that the nose man has been guilty of, and that is making a naso-maxillary opening and leading the patient to believe that this is a curative measure. I have in mind a case where there was an opening made into the nose, or, in other words, the nasal cavity was extended to take in the maxillary sinus instead of letting it come out through the opening in the mouth. That is the only advantage they have. The reason we have these troubles, and the dentist doesn't notice it and cannot notice it, is because in many cases the pulp dies, and the floor of the antrum is punctured, and it gives no pain. We fill the tooth, and we hear no more of the patient, but the patient gets relief through the opening into the antrum and on into the nose and escapes. With the X-ray we would not make that grievous error.

DR. WM. LITTERER, Nashville: As to the reliability of the X-ray, will say that what little experience I have had I am sure it is quite reliable. It is certainly one of the most advanced means of diagnosis not only in surgery but in medicine that we have today. The question of focal infection I think is one of the most important subjects that we have in medicine as well as in dentistry. It has been stated that the people dying from old age really die from focal infection. If it were not for focal infection they would probably never die; would just dry up and probably live a thousand or more years. We sometimes have focal infections not only in the mouth and head but in other parts of the body. I believe that practically all cases of neurasthenia are due to some form of focal infection. The enormous number of them, probably ninety per cent., are probably due to some form of streptococci. Negative cultures are due to the fact that you have not used the right culture media. The various reports are given where you only get about ten or fifteen per cent. of growth. Really, that ought to be increased up to ninety per cent. or even higher than that. Of course, there may be other bacteria associated with the streptococcus.

The removing of the focal infection sometimes does no good for the time being. This is due to the fact that the infecting micro-organisms have wandered from the focal point and have lodged in some joint or muscle, etc. In other words, metastasis has taken place. In such cases it would be well to use an autogenous vaccine. Where the bacteria have not left their source but simply the toxins, removal of the focus of infection would result in the clearing up of all symptoms very promptly. In such cases the vaccine treatment would necessarily do no good. I have very little faith in the stock vaccines. I think they do no good. Rosenow of Chicago has shown that strains of streptoccoci have selective action for certain tissue. They lose this selective action in a few days when they are grown artificially; hence stock cultures for vaccines are of little value. The subject of focal infection is one of the livest subjects that we have in medicine today.

Dr. Wm. F. Stone, Chattanooga: Right along that line I have a few thoughts that occurred to me. A neighbor of mine last winter came home from school with articular rheumatism. His local physicians could not find the trouble, and he was sent to Nashville for examination, and they went over his case thoroughly there and found no cause. Asked him if there were any dental troubles, and he informed them that there was nothing wrong with the teeth; they asked him if he was positive of that, and he told them he was. They did not go further and make an examination of oral cavity, but informed him that they could not find his trouble, though he had an infection somewhere. He returned home and was confined to his bed for three weeks, and was then taken to Atlanta and had another examination. There his specialist found nothing, but said there was an infection. They asked in regard to the condition of his teeth, and he said he thought they were in good condition. He was asked if he was positive, and he said, "Positive." His physician said, "We'll go further; we'll see for ourselves." He called in a dentist and he made an examination and found nothing from an outside examination, but when they put him under the X-ray they found an abscess under a lower molar with drainage through parotid glands and an auto-infection there, which they cleared up, and in the course of a few weeks he was up and around. I know this to be a fact, as he was a neighbor of mine.

Another case was one of our home men who had been under treatment locally, was on crutches and he happened to be in Philadelphia, and in consultation there with an eminent medical man who was a personal friend. They went over him thoroughly and told him that he had some infection, but he could not find it; that it was evidently in the nasal region and when he returned to his home city to hunt up his dentist and see what he could find. He came to me. He had three bridges in his mouth; these bridges were attached to six teeth, four above and two below, all posterior teeth. He had one gold crown on an anterior tooth. On a superficial examination they appeared to be in perfectly healthy condition. The membranes were all in a healthy, fine condition; teeth were firm and strong. I advised a radiograph and it showed in the region of the upper right third molar an abscessed condition which was, I thought, causing the trouble. I removed the bridge and opened the tooth up. I got very good drainage; I could tell there was some pus. This is one instance where I gained confidence in the reliability of the X-ray. If I had opened that tooth without the radiographs I would have had to go into all those crowns, and then I would not have been positive. With the radiograph I went directly to the seat of the trouble and relieved it. The man discarded his crutches in from seven to eight weeks, and today he is without a cane for the first time in two years.

Dr. O. J. O'Neal, Chattanooga: Doctor Cayce's paper is one that deeply interests me. Our leading physicians of today first look to the oral cavity for infections that may be the cause in systemic diseases, and the origin of many diseases are traced to bad tonsils, infected antrums of Highmore and most frequently from abscesses of teeth that are not expected, and as Doctor Cayce has shown us, probably never would be located if it were not for the X-ray that reveals their presence.

Dr J. A. Gardner: I would just like to speak on the question of the X-ray in diagnosing the connection between the dental and the medical, and to establish the abscessed conditions that are of dental origin where we have an abscessed antrum. Of course, we all realize that the X-ray or radiograph is simply a shadow—shows only a shadow of the conditions that are present there. If for any reason we suspect that there is an antral disease, an abscessed condition of the antrum, then the first thing to do would be to examine the teeth to find out if there are any dead teeth in that immediate neighborhood. If a dead tooth is found, then it should be suspected at once of some connection with the trouble, and a radiograph will help to establish that connection, if there is any connection. It does not always prove that it is or is not; it is just evidence that will help to clear up the case.

Dr. E. B. Cayce (closing): I appreciate the liberal discussion. Doctor Morrison mentioned the question of whether you should take two or five teeth in examination. That is often a question of skill in the radiographer, and the point that I brought out is interpreting of plates. With the same picture there may be some will way, "I think I had better take that tooth." Another man will say, "Leave it alone; maybe it will regenerate and can take care of itself if you remove the main infection." That is a question that requires skill and experience in determining what you should do when you get your X-ray plate. Doctor O'Neal spoke of the rule in Chattanooga. I don't know what the other men do in these cases, what rule they follow, but if a case after an X-ray picture proves of dental origin, I know the dentist will go up there and remove *all* diseased tissue. I feel like it is magnifying the operation to have the dentist come and pull the tooth only. I send for the dentist, or refer the patient to the dentist, and under local anesthesia he pulls this tooth and removes all of the tissue. I have seen Doctor Bogle, only three weeks ago, remove (I think it was four or five teeth under a bridge) the entire floor, an area half as long as my finger and almost as wide; every bit of the diseased bone was removed. There is no necessity—it is not fair to the patient to take that patient to the hospital and give him an anesthetic and let the dentist pull the tooth, and then go up with your gouge or curette. It can be done more skilfully with a large dental bur and with less shock, and I think it is best, and that is the rule I follow. I don't know about the other specialists in this city. The first thing to do is to determine if it is of dental origin. If it is of dental origin, it is a dentist's job; if it is of nasal origin, it is the job of the rhinologist; and, as Doctor Godwin said, when you get a case of nasal origin, you usually have some other pathology in the nose. If it is simply an acute condition, you wash it out a few days and it will get well. If it is a chronic condition, you have got to take care of every focus in the nose as you have in the focus of infection elsewhere, whether it be in the tonsil, tooth, etc.

Now, Doctor Godwin mentioned the round that he and the specialist had. I suspect that is occurring in Nashville right today. Fortunately, I don't know anything of it, because I am friendly with the dentists, and I feel that if really we work for the good of the patient it is necessary that we work together.

I want to emphasize the fact that no antrum should be operated on without excluding the alveolar pathology. If that man's case had been X-rayed at first, he would have been saved much pain. Have a radiograph, even if you feel positive in your own mind it is not of dental origin, as I have seen several that have been proved of dental origin in apparently healthy teeth. It is worth while to the patient if they are able to pay $10.00 to have it done; and if they are not able, I have some good friends that will take them for nothing, and say, "Much obliged." And I really feel like I am correct in saying that I never shall operate on an antrum without an X-ray picture.

I have curetted and scraped the mucous membrane out until that antrum was clean and dry as a bone, and they kept on discharging, and I expect some of them have gotten tired and are going to somebody else, but if they ever come back to me, we will take an X-ray picture and we may find it is of dental origin.

I think too much curetting is done. Ballinger advises against curetting the mucous membrane. He brought out in this paper the point that Doctor Litterer made: he says if after you exclude dental pathology or alveolar pathology you will make a good free opening through the nose (and that opening means that the floor is made perfectly level so that there is no secretion that remains in the nose) and have a vaccine made, and that is all that is necessary. And he advises very strongly against curetting the mucous membrane of the antrum. Doctor Litterer told us how to live a thousand years. When I was a small boy around in a neighboring town I used to hear of Doctor Litterer. You all see he is still young.

Now, I want to mention in the treatment of those cases I have outlined what we do. Those cases where they have a tooth out, and I have to do other work like removing the tonsils: we will give an anesthetic, as I did last week, to remove the tonsils. First I go up and remove the diseased tissue, and pack the antrum, and the next morning remove the packing. It is not necessary to wash out the antrum if you have made sufficient opening. The patient can wash out the antrum. I have the patient rinse the mouth out, and then fill the mouth full with a pressure, as if they are going to puff the cheeks; it will come right out through the nose. Those openings, depending on the size, will last anywhere from two or three weeks to a month, or sometimes six weeks, and by that time if you have removed the pathology, there is no occasion for irrigating that nose. In the meantime if that cavity through the nose gives a whistling sound, and the food getting in there worries them, they can use a little cotton up there. They should be cautioned as mentioned in the case Doctor Bowen quoted: they may get cotton up in the antrum and it acts like a foreign body; or the dentist might make a plate. In Vienna they use them in those antrums they want to keep open—they use a little rubber plate; it is just simply a round piece of rubber with a cap to it, that they slip right in. I used to irrigate an old woman's nose who, I think, had it irrigated for some twenty-five or thirty years; she would pull out the peg and I would irrigate it.

Dental radiography is a new thing; I think it has been only the last six or eight months that I have been insisting on every patient having an X-ray picture made in antrum cases. And the treatment of it, in a nut shell, is, remove the necrotic tissue; the antrum will take care of itself with very little irrigation; and then for the comfort of the patient, fix them so that the food and the air won't worry them by getting through the antrum, and very soon nature will correct any opening that is left. I is proverbially true that the openings you want to close won't close, and those you want left open, close. They are very trying in that regard, but as you all know, after you pull a tooth, and go in next day, you have very little cavity there, and the same thing is true in these antrums, only of course it takes longer.

PORCELAIN INLAYS*

BY DR. F. B. ROBERTS, PITTSBURG, PA.

Judgment must be used in the selection of different filling materials to suit the case, and this is especially true with the porcelain inlay as a filling material. It is indicated, however, in a great many cases, especially in the anterior teeth and when the cavities are fairly large. The cavity is prepared for the impression either to be taken by the direct or indirect method. The direct method is by burnishing, and with tape and chamois disks, pressing the foil into the cavity, after which it is filled with wax. After the impression is taken it is best to invest before baking. The indirect method is by heating a piece of dentalac and forcing it into the cavity, a die is made of this and the matrix of either platinum or gold foil swedged.

The foundation body is now mixed with equal parts water and alcohol and fused in the electric furnace. After this the enamel body, after selecting the correct shape, is mixed in the same manner and baked. I find the results are better by baking the porcelain slowly and allowing it to cool slowly. The foil is then removed and the inlay cemented in position.

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*Clinic Odontological Society, W. Pa., 1915.

IMPRESSION TAKING, USING MODELLING COMPOUND*

BY J. V. HOWARD, D.D.S., INDIANAPOLIS, IND.

YOU ALL HAVE SEEN this method of impression taking in the state of Indiana twice in the last year, and I dare say there are not five of the dentists at this table who are using it. Here is the proposition: Your patients come to you, edentulous, and they are as helpless as a two-day old baby. They come in and say, "I want something that I can eat with;" and the Lord knows they need it, and you know they need it, and if you are satisfied to practice in the old way, of choking your patients with plaster of Paris, and then build a finished plate over that imperfect impression, the Lord help *You.* There is absolutely nothing so important to you and to your patient, and you are not doing for your fellowman what you would want him to do for you unless you are giving him the best that is possible for him to have. And if you are taking impressions the old plaster way, you are not doing the best you can do. The first thing is to diagnose the oral cavity and then select a tray that will fit the patient's mouth. It is a good thing to take an impression first to get an approximate model. Then get a tray that practically fits; if it doesn't fit, bend it down—these are very soft—bend it down until it does fit. It is a good thing to start out this way. This is the student's method. After you have your tray conformed to the mouth, you put a little Kerr's modeling compound in the tray and shape it to approximately fit the model. Don't buy some other compound; you can't use it in this work so well. (This sample is made to show you the way your old tray would look. You would make a plate over an impression like that in the old way. Now, how in the world can your muscles work down in a thing like that? Can't do it.) So we lay just a small amount in our tray that has been fitted to the mouth, press model into it, using clean soapstone on model and the compound will not stick; and then while our material is still warm remove the model for fear you cannot do so when compound is cold. You try that trial impression on your model again. If you have an excess like this, you take your knife and trim it down so that it is about what your finished plate would be, only a little thicker. You know, the more you trim away from the outside of the finished plate, the weaker you make it. Vulcanize your plate under a lower temperature and for a longer period of time, and you will have a tougher plate.

Now, we have our trial impression and we go to Mrs. Jones with something to put in the mouth that is almost like her finished plate would be. I usually (after using the student method) have some boiling water in this little pot with a small spout. Do not pour this all over the sides, because the muscles of the mouth will distort these sides. You want those sides as chilled as possible. We pour this in until the water runs off at the heel; hold it a little bit, that will soften the inside. Then we press it into Mrs. Jones' mouth; we tell her beforehand it is going to be hot, but it will not burn her. You have it one degree on the safe side of the burning point, and quickly pass it into her mouth and with a wave-like motion press it up to place at about the pressure she will wear her finished denture. Now you desire to get an impression of all the muscles that are going to play on that plate. There are about fifty muscles of expression and mastication combined, each one of which plays its individual part on the finished denture, and you have to accommodate them in the impression. You can easily do it with your impression; the muscles will do it, if you know how. So, while we hold our impression firmly to place, take a cotton wad or small sponge saturated with ice water, place it quickly under the palate and the impression will soon chill. Take a little extra time until you are sure of these things. After it is chilled you can now take it out; (yes, there is a handle that goes on the tray if you want to use it, and then you can take it out after you have finished and throw it to one side).

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*Clinic Northern Indiana Dental Society, 1915

You will find that our impression now comes loose from the palate with a smack. You have an impression now of the hard palate, and you cannot make a mistake on that. There is no use in having a suction chamber, because it will fill with tissue anyhow. If you have that impression stick now with just a little smack as it comes out, you know you have an impression of the palate. Now chill the whole thing. Every time you take it out of the mouth you want to chill it. Then we begin our muscle trimming and conforming. I usually take one side at a time. We warm this up thoroughly on the left side first. (You had better take one at a time; I still take one, and have been working at it several years). Let the heat soak in until it is in the semi-flowing state—don't burn it up; your Bunsen burner won't do. You have to use an alcohol lamp through this whole procedure. Pass the cold side of impression into the mouth first, holding the muscles away on the other, and bring up the warmed side to place, having previously instructed her how to muscle trim, thus: "I want you to work your muscles in all conceivable forms and shapes." Show her how. Get right before her and twist your mouth as you want her to twist hers.

Now, then, you are working one side only of the impression, and she is working both sides of her mouth, but one side won't work down because the compound is cold. Each time after you have warmed the side, just before chilling, conform by holding the face between the thumb and index finger; nature has provided that hand so that it exactly fits Mrs. Jones' mouth. It is funny, but it does—goes around there as far as it should go.

After it has been thoroughly muscle trimmed on each side (you go to both sides at least twice, because the first time the muscles only pull partly down), then as the finishing touch on each side, you conform it. Now, then, hold it there until it is quite chilled so it will not rebound by the muscles' action, for if it does, you will have a leak. Now begin by trimming out the heel of the impression. If it is too big, trim it down. Begin warming this up, and this is probably the most important of all. You want to get that good and warm so you can feel it give. Press it up a little; you want to have it very thin.

"Now, Mrs. Jones, I am going to put this in your mouth;" it may be necessary beforehand to put a little warm water in her mouth. Then you place this in her mouth and say, "I want you to quickly take your tongue, ball it up in the back here, like that, and then swallow." Put the water in her mouth so she has something to swallow. When she swallows that pulls all of these palatine muscles, and those muscles will all pull down in the impression. You can quickly reach in with your finger and press it back gently—too hard will distort them—they are very soft muscles, and you must press them gently, and then dip your finger in the ice water and run it under that thin knife-edge heel and it will chill as quickly as I am telling you about it.

Now, if your impression sticks up, you can rest assured that you are going to have a finished plate that will fit and stick, if your laboratory treatment and your subsequent treatment are properly carried out. And if your impression does not stick at that time you keep working at it until it does stick. Your plate will not stick unless your impression does. If she laughs it down, it is the muscles of expression that are pulling it down, and then you find out which pulled it loose, and work it out again, and if it is one of the palatine muscles, you go ahead and slightly trim the pattern and keep that up until it sticks. That is all there is to it. Your impression must extend back onto the soft movable palate; not too far, because it will nauseate your patient. It must go beyond the hard palate, because there must be suction; it must go all around and touch the soft tissues; usually about one-sixteenth of an inch onto the soft palate is sufficient, but remember it must extend back onto that soft, movable palate.

It seems fairly clear that, under ordinary savage and barbarous conditions, rather more children are produced and rather more children die than among ourselves; there is, in other words, a higher birth-rate and a higher infantile death-rate. A high birth-rate with a low death-rate seems to have been even more exceptional than among ourselves, for under inelastic social conditions the community cannot adjust itself to the rapid expansion that would thus be rendered necessary. The community contracts, as it were, on this expanding portion and largely crushes it out of life by the forces of neglect, poverty and disease. The only part of Europe in which we can today see how this works out on a large scale is Russia, for here we find in an exaggerated form conditions which once tended to rule over all Europe, side by side with the beginnings of better things, with scientific progress and statistical observation.

WHAT ALL DENTISTS SHOULD KNOW ABOUT ORTHODONTIA*

BY W. E. LUNDY, D.D.S., MEMPHIS, TENN.

PROFESSOR OF ORTHODONTIA, UNIVERSITY OF TENNESSEE, COLLEGE OF DENTISTRY

FIRST, THEY SHOULD KNOW its importance. The health and appearance of the individual are to such an extent dependent alone upon a normal occlusion that the more one studies the subject the more its importance appears, especially if he will reason back from effect to cause, and see in what a shameful state of affairs a few minutes' thoughtless work or advice had resulted.

Every man who is practicing dentistry should know the normal occlusion of the teeth, and should be able to differentiate the deciduous teeth from the permanent, and should by all means know how much the development of the face is dependent upon the retention of the deciduous molars and cuspids, till they are due to be lost, to make possible the normal eruption of the permanent set. He should be able to look into the future and see something of the deformity that is certain to develop under abnormal conditions. He should be so observing that when a little one presents, and he sees decay in the deciduous second molar upon the distal surface, especially, he should remember that the first permanent molar should push, if you please, upon this distal surface for five years, if things go on as they should in the plan of development. Also, if this push is to a successful one, the first deciduous molar also must be retained, in most cases, three or four years after the eruption of the first permanent teeth, and also its mesio-distal diameter preserved.

But, you ask, what are you going to do when the teeth are all aching and abscessed? True, you will find that condition many times, and then is the time to get in your best licks. Point out the evils present—an object lesson to touch the heart of any one. Tell how much a growing child needs a comfortable masticating apparatus. How necessary it is to health, happiness and good school work, and that will go a long way toward caring for the younger ones, at least. But, you say, what are you going to do for this one? Well, you must use your common sense, and do the best you can, which, however, is the thing to do in all cases. One thing you must do is to put off removing the deciduous molars until it is time for the eruption of the bicuspids, if possible. Disarticulate these temporary molars by grinding with a stone, when necessary, and if you keep only the roots until the time for the bicuspids, you have done that child a service worth while. The permanent first molars will drift forward but slightly, if only the roots of the second deciduous molars are retained; and that they will drift forward the whole space occupied by the second deciduous molars if they are removed early enough is evidenced by models in my possession, and I judge, in the possession of all men who have done any work in this line.

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*Read before the Tennessee State Dental Association, 1915.

Every dentist who makes any pretense toward respectability should know that the incisors and cuspids should be in contact at four and a half years, and should be separated at six and a half to seven years and, unless they are separated at the latter period, that child needs orthodontia right now while you have your deciduous teeth to work with. You should not forget, however, that one of the meanest types of malocclusion comes from too long retention of the deciduous molars, which is the open bite.

It is the duty of every dentist to examine carefully every child that comes under his care and see if the deciduous distal arches are in proper shape and in correct relation to each other. If there is trouble, the sooner the treatment for its correction is begun the better. It is important that every dentist should understand the normal relation of the teeth, for 'tis truly said it is the foundation of modern dentistry.

A large percentage of cases treated are failures. The cause is the dentist's lack of diagnosis, under-estimate of time and trouble, and the patient's failure to understand what is expected on his part. The dentist should understand, first, that it is his duty to prevent malocclusion and not to cause it, and he should know the causes, which are many, and remove all in his line and refer the case to others for the rest. It may be of interest to call attention to some of the causes: Accidents, adenoids, or other nasal obstruction (polypus deviation of the septum), too early or too late removal of deciduous teeth, loss of permanent teeth, tongue too large, bad fillings, tumors, habits (tongue, lip and thumb sucking), abnormal frenumlabium, pyorrhea, paralysis, ill-fitting crowns and bridges, supernumerary teeth, malformed teeth, transposed teeth, non-eruption, etc.

The question often is asked in regard to the removal of tonsils and adenoids, as to the danger of impairing the voice. Failures have occurred, but not from the removal of the diseased tissue, but by the lack of skill on the part of the operator, poor surgery, and damage done to other parts. Good authorities say the voice gives its best tones only when these obstructions are removed, and that after their removal expansion of the arches will help restore normal breathing, upon which much depends.

TREATMENT

Cases in inexperienced hands are generally failures, one way or another. The first great cause of failure is too small a fee, and no clear understanding of the responsibility that the parent and patient have in the case. The dentist is so imposed on by the time the case is completed he does not care to try another. If he were paid in the same proportion for a gold inlay, it would not be long until he would quit making inlays. I think when I hear a dentist say, "it's a long job," etc., it just strengthens my argument, that he does not get paid for his time.

Of course, admitting that one must study orthodontia to know anything about it at all, and the fact that he does not, is no reason that he should not know—that modern appliances have made quite easy many cases that were once very difficult, and that removable varieties almost entirely eliminate pain, and are thoroughly sanitary, two of the great objections to the fixed varieties.

There are more failures from wrong diagnosis and poor retention than all else combined. One thing I would urge on all dentists is to be careful of the *extraction* of permanent teeth. In most cases it does irreparable injury and no good. If you expect to refer your case to a specialist for correction, do not extract any teeth until you let him see the case. This applies to deciduous teeth as well as permanent; if anything, more so. If you want to make a good impression upon your patients, tell them you want to do all you can to prevent future trouble, and you want to refer the case to Doctor Blank before you proceed. Should you undertake the treatment of malocclusion, get some instruction from some friend, and about fifteen dollars' worth of text books, and read up on it.

DATES OF SOME OLD DENTAL PATENTS

BY H. L. AMBLER, D.D.S., M.D., M.S., CLEVELAND, OHIO

The following are the dates of a few old dental patents that I gathered during a short visit to the "model building" of the United States patent office:

Dr. David Evans—Anatomical articulator, 1840.
Baker and Riley—Turnkeys, 1845.
C. H. Dubs—Forceps, 1848.
R. Spencer—Dentist's drill, 1848.
F. Davidson—Saliva pump, 1854.
A. J. Watts—Crystalline gold, 1860.
J. C. Dean—Automatic plugger, 1865.
Dr. I. A. Salmon—Automatic plugger, 1867.
George F. Green—Pneumatic bur and drill, 1868.
E. A. Hyde—Pneumatic plugger, 1869.
George F. Green—Pneumatic plugger, 1869.
J. B. Morrisson—Dental Engine, 1871.
Dr. G. V. Black—Dental Drill, 1871.
W. C. Michaelis—Using metal bar on lingual side of front lower teeth, to connect bicuspids or molars mounted on metal or vulcanite, 1860.
Dr. D. Maynard—Fine file for serrating pluggers, 1884.
Feorge F. Green—Electric pugger, 1875.
Joaquin Bishop—Electric plugger, 1875.
Dr. F. A. Bonwill—Electric plugger, 1875.
George F. Green—Electric motor, 1876.
Julius A. Bidwell—Dental mallet, composed of an open-end cylinder or shell of hard metal or other hard material, inclosing a soft metal core or filling, and provided with a suitable: May 31, 1870.

PRESIDENT'S ADDRESS*

BY DAVID P. HOUSTON, CHATTANOOGA, TENN.

WE ARE ASSEMBLED in the Capitol city of our state, on this 24th day of June, 1915, in our forty-eighth annual meeting, and it affords me profound pleasure to extend tc you most hearty greetings and cordial welcome. We have met to do team work. Destructive indifference is being supplanted by constructive co-operation. This is being effected by organization. Men who ply the trowel, wield the pick, follow the plow, push the pen, run the press, guide the drill, preach the gospel, adorn the professions, are organizing for the purpose of co-operation to take up slack and to eliminate waste. Co-operation is moving in the very teeth of the wind, and it is our business and purpose to extract the teeth when the wind bites too much. We must co-operate.

There always have been men of large calibre in the dental profession, who have been far-sighted and cognizant of the real meaning of dentistry. I am sure, however, that that number is far greater today than at any previous time. More men are realizing that to be a successful dentist nowadays, one must delve deeper into the scientific causes of dental lesions and be intelligent and skillful enough to put that knowledge into practical dentistry, realizing the good a conscientious dentist may do to his fellow men.

I take it that the men who have come to this meeting feel that they have not learned all that is to be learned about dentistry, and realize that the mere meeting and exchanging of ideas will create a better outlook for our professional life, and I am sure that the essayists and clinicians on our program have something that will be helpful to our entire membership.

I must congratulate the men who have come here, for it shows that they have the interests of the profession at heart.

Suppose we had no association—do you think we as a profession would have the same standing that we enjoy at present?

The first thing I want to impress upon you is the good of, and the necessity for, an efficient organization; and I want to say that if you feel that you have not gained one thing at this particular meeting, do not get discouraged and determine never to attend another. Be a member for a more unselfish reason. It is more blessed to give than it is to receive, and there is not a reputable dentist in Tennessee who cannot give something to this body—if he will only attend and participate.

At this time I cannot refrain from referring to the oft-quoted statement of Dr. Chas. Mayo, wherein he said, "It is evident that the next great forward step in medical progress along the line of preventive medicine should be made by the dental profession," and asked in conclusion, "Will they do it?" thereby intimating, at least, that there might be a doubt.

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*Read before the Tennessee State Dental Association, 1915.

Gentlemen, it did not remain for any one man to discover this fact, for every progressive dentist has known this for a long time. It is a fact that the medical profession and the public at large are realizing the importance of a healthy oral cavity more than ever before and the oft-quoted statement is as much an indictment of the dental profession, that we are not doing our full duty, as it is a precept to the public to observe the rules of oral hygiene.

We have the challenge! It is up to us to first qualify ourselves to the very best of our ability and then in our more intimate relation to the public, as regards oral and dental disease, reflect the progress of the times.

Our National Association is just now re-established along new lines. Every state society in the union is a component society, and I cherish the hope that Tennessee may not be a laggard in the march of progress. The same spirit which makes us proud to refer to Tennessee as the "Volunteer State," should have its counterpart in a spirit of pride that the dental profession in Tennessee may be a greater power for good, not content to follow—but to lead.

To the end that we may be of more service to humanity, we must put ourselves in position to help ourselves first. As a chain is no stronger than its weakest links, so is an association no stronger than its individual members. We must first get a broad vision of our individual and collective capabilities by first realizing that a dentist should know more than just how to "fill a tooth."

An association should teach its members the best and most advanced methods of practical dentistry and the friendships fostered by frequent reunions of dentists and the element of personal contact with some of the recognized leaders in the profession will aid us to get that greater vision of our real mission to humanity.

Too many of us seem to think that when we get our diploma and license to practice we do not need to continue to study. We seem to feel that dentistry is a fixed science and feel that we know all that is to be learned. The function of a dental society is to promote a desire among its members to study, to think and to evolve, by frequent discussions of the every-day details of practice, better methods, and by social intercourse and good fellowship to strengthen the ties which make for professional solidarity.

In a broader sense, its aim should be to improve its members, that they may render better dental service to the people of the state and nation. It is evident, then, that every person proposing to render dental service should be affiliated with the dental society. A society composed of one-fourth the legal practitioners in this state, cannot be of any immediate benefit to the patients of the other three-fourths, who are non-members. It is plainly the duty of those who may be far-sighted enough to see the advantages to be derived through organization, to seek in every way possible to induce the great number of non-members to join, and by a fair and sensible administration of the affairs of the organization, maintain to the greatest extent the activity and enthusiasm of all those who are members. In those states which seem to be the most progressive, and which give the most benefit to their members and to the general advancement of the profession, they have organized the entire state into district societies, and local societies, all of which are chartered by and under the control of the state society. While there may be objection to this plan in Tennessee, I feel that it is due more to lack of energy and vision than to any real objection.

I realize that my plan may not comport with yours, and it may not be the best one, but I submit the following recommendations with only the hope that it will cause you to seriously consider the question of a change in our constitution and by-laws. I herewith recommend the following changes, which to me seem wise to make, it being my chief purpose to recommend some cardinal changes to the end of perfecting our organization:

First, the creation of component and district societies, which shall be chartered by and under the control of the state society.

Second, to be governed by an executive committee or council composed of one member from each district; the president and secretary to be ex-officio members.

Third, the creation of committees with well defined duties, suggestions as follows:

1. Program committee, which shall be appointed within three months at least after the annual meeting, and whose duty it shall be to consult with each other under the direction of the chairman of said committee, with a view of formulating a program far in advance of the annual meeting.

2. The executive committee shall have the responsibility of all the business affairs of the association.

3. There should be a committee on practice, which shall at each annual meeting read a resume of new methods in the practice of dentistry, which are worthy of note.

4. A committee on science and invention, which shall keep in touch with the literature of the profession and report the most noteworthy contributions, and such inventions as may affect the practice of dentistry.

5. A committee on legislation, which shall study more especially the legislative enactments necessary to the best interest of the association, and to take the initiative in having them passed, and to keep in touch with the bills presented before the legislature with a view of discouraging any which may be against our interest.

6. Oral hygiene committee, which shall keep in touch with all similar committees and organizations for the promotion of oral hygiene, and devise plans for our consideration for the advancement of this movement, and to report the advancement of others along this line.

7. Publicity committee; to seek to bring before the public a favorable notice of the work of our organization.

8. Journal committee, necrology committee, grievance committee, membership committee, and possibly others.

In some states they have a bulletin published by the association which is a splendid way to arouse and keep up the enthusiasm among its members, but I would not advise too much for us at this time. We want real progress, and too much machinery may become burdensome. However, we must have skilfully devised machinery if we hope to accomplish much, and I would not dare to suggest too much in detail the exact nature of it. I would recommend that a special committee, or the committee on president's address, study in detail the machinery of other more progressive states and report a tentative draft of what would be to our best interest. While it is usually a serious matter to tamper with the organic law of any body, I feel that in view of the fact that better defined rules seem necessary for a more successful conduct of the affairs of the association, we would not make a mistake to make the change at this meeting. Certainly it would be wise to consider seriously this matter. To do this successfully will require more active work on the part of all of us, but if we hope to accomplish much in anything, we must put our shoulders to the wheel.

May I call your attention to the work being done by the committee on scientific research of the National Association, and urge you to show appreciation of their work by at least reading their reports and further by donating to the fund for its maintenance?

The men most active in this work are big, broad-minded, unselfish men, and by their labors are adding to our scientific literature, which is the greatest boon to our progress as a learned profession.

The question of oral hygiene in public schools should be met by some form of resolution from this body, outlining some definite plan. It is an economic proposition for the state to consider, and one of humanity for us to promulgate. It is a crime against civilization for the mouths of little children and others to be allowed to become foci for infection, when the means of precaution and remedy we now have are at their disposal. Surprising is the ignorance that even otherwise intelligent parents show, at times, when it comes to the care of their children's teeth. It is not the child's fault; the parents are to be excused to a certain extent, for we have not educated them.

I would recommend that this association go on record as favoring and encouraging dentists all over the state to seek in a dignified manner to be allowed to speak to school children along the lines of the care of the teeth, and its great importance to their general welfare. In this connection, to show the advantage of having dentists organized, although they be in small towns, a dentist speaking to a body of school children as representing a certain dental society, would have more prestige, and his remarks would have more weight than if coming from an individual, and speaking as the representative of an organization of dentists, there would not be the same chance of criticism from his colleagues.

A matter which was before you at our last meeting is still of greater importance, both as to our own and the public's interest, namely, that of having a member of our association on the state Board of Health. The medical profession is realizing the importance of better oral conditions, and it would be a reflection on the standing of our profession if this phase of public health were left in the hands of any other than a proficient dentist. Not only should the school children be taught, but the charges of the state in its eleemosynary institutions should be looked after. In every public hospital a dental surgeon should be on the staff, not only to honor the profession, but to render valuable and needful service to patients there. A man's recuperative powers are greater if his mouth is not reeking with infection, as is the case all too often. Therefore, it must be conceded that, other things being equal, a patient will recover more quickly if his mouth is in the best possible condition. This being true, the budget to maintain these institutions would be decreased and the state would profit. As stated, it is an economic proposition for the state to consider, and if this could be shown, there should not be any delay in accomplishing our object.

At the beginning of my administration, I had the idea to increase the membership, but I found that the solicitation of new members was somewhat like the work of an evangelist. You think you have a man in the notion to become a member, when he tells you he believes he will wait a while; he says that he knows he ought to, and really does not know why he has not done so before. Many such men are good material for our association, and we should not give up trying to get them in. I would like to see every dentist in Tennessee a member of this association, but I would not lower our standards to do this. I would have membership in the Tennessee State Dental Association stand for something in the mind of the public, and the fact that a man refuses, without adequate excuse, to become a member, should brand him as unworthy of our professional confidence.

I cannot see why there should be any appreciable antagonism among the members of our profession; why should we not all be banded together according to the stated object of our existence in Article II. of our constitution, which reads: "The object of this association shall be to cultivate the art and science of dentistry, together with its collateral branches, to elevate and sustain the professional character of dentists, to promote among them mutual improvement, social intercourse, and good feeling; and to collectively represent and have cognizance of the common interests of the dental profession in Tennessee."

To this end I have with the unanimous consent of the executive committee, sent to every dentist in the state a program of this meeting, in which every ethical man is cordially invited to attend and become identified with the organization of his profession, both state and national, at the same time.

In the effort to gain new members for our organization, and in that way extend its field of usefulness, I have had the hearty support of the membership committee, and I trust that we may see some results by the addition of many new members at this meeting.

It is impossible for all to attend every meeting, and if a member is in arrears for two years' dues, his name is dropped from the list, according to our by-laws. It is the duty of the treasurer to seek to collect the dues of every member who has not been present at each meeting and paid his dues at that time. But this requires a great deal of work, and most any one of us would be prone to procrastinate and slacken our efforts if we meet with much discouragement. I would, therefore, recommend that the treasurer be required to collect the dues of every member not in attendance as early as possible, and that he receive 10% of all dues so collected, except that which goes to the National Association. A member of the National Association is dropped after one year's dues are in arrears, and as not receiving the *National Journal* alone is a serious loss, every effort should be made to induce a member to retain his membership.

In submitting this address to you, I am not unmindful of my own limitations, for I have been a member for not many years, and I realize that I am not as capable of directing the affairs of this association as others would have been. I trust, however, that the association may not have retrograded, for it has been my ambition to advance its interest and its prestige. I am deeply sensible of the honor the association has bestowed on me, and I thank all of you, and more especially the various committees all of whom have rendered valuable service. I have been exultant because of my promotion to the honored position to which this association elected me, because I realized that it was not given me for what I had done, but I esteemed it as an expression of confidence on the part of my fellow workers and a laudable effort on their part to encourage me to greater proficiency and usefulness.

As to how well I have kept and performed the trust you are the judges, but I am conscious of having done my utmost to merit your "Well done, good and faithful servant."

I thank you for all the many good things you have done for me.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS

Your committee begs leave to make the following report: The president's address is filled with many timely recommendations and valuable suggestions. Those considered of most importance are, first, the organization or creation of district societies. This is a matter to require considerable time and thought in working out best plans for its organization, yet we feel that it would be of great value to profession and commonwealth. Another point which the president has suggested, which meets with hearty approval of your committee, is that of defining the duties of the standing committees of our state association. We feel that nothing could be of more importance than to have duties of different committees published in the constitution and by-laws, as we find in most state association bulletins.

We also desire to lay especial stress relative to lectures in public schools, and these lectures to be delivered by appointee by state district societies, and would like very much to call special attention to the most timely recommendations that we as a profession and individual members lend our hearty support to the president's recommendation as to hospital internes.

We compliment the president on his paper, and feel that he, with his earnest zeal and unusual enthusiasm, has brought about this excellent attendance at our opening meeting.

F. W. Mescham,
W. W. Jones,
J. A. Gardner.

SOME THOUGHTS ON EDUCATION*

BY HENRY W. MORGAN, M.D., D.D.S., NASHVILLE, TENN.

IN RESPONDING TO THE REQUEST of your president to read a paper on "Education," I do so conscious that it is difficult in these days of vocational training to deal with the subject so as to lead minds of the members of an association of professional men away from problems of their every-day life. At the risk of being a bore, an effort will be made to direct attention to some consideration of what education is, and to answer some of the popular criticisms that all must now and then have heard.

Let us first see, what is education? It is not the mere acquisition of knowledge, the cramming the mind with facts, or "on the part of the educator the mere impartation of knowledge." "In the newly awakened zeal for knowledge," says Mr. Huxley, "we run the risk of forgetting the truth that while under-instruction is a bad thing, over-instruction may be a worse. Success," he goes on to say, "in any kind of practical life, is not dependent solely or indeed chiefly, upon knowledge."

This is a fundamental principle many educators either do not credit at its full value, or if they do in their work of grading, often ignore. What men need is enough knowledge digested and adjusted to the end that it is useful and properly equips them for the objects they desire to accomplish in the world. It must be thoroughly assimilated and organized, and in our profession go hand in hand with an enlightened judgment and awakened consciousness of the power it gives, and should be coupled to finger craft that executes, if it is to produce the result that, after all, is the goal to be achieved. Over-education for these reasons may be injurious. It produces persons who are heavy and impractical. Herbert Spencer defines education as "the preparation for complete living—with the emphasis on the word *complete*." President Nicholas Murray Butler, of Columbia University, says that education "is the adaptation of a person, a self-conscious being, to environment, and the development of capacity in a person to modify and control that environment."

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*Read before the Tennessee State Dental Association, 1915.

Educators, therefore, insist that education aims not at mere knowledge or mere power—but at knowledge and power put to right uses—for the fullest expression of the life of a person under all circumstances.

To quote from another paper on this subject, prepared a year ago: "A man is educated who is trained in his perceptive faculties; in his analytical powers—so trained in all his abilities that when surrounded by difficulties, he will be able to see where he is, able to understand what the occasion demands and able to master his conditions, instead of being overwhelmed by them. The man overcome by his condition is not educated. Useless knowledge, then, is not education. Practical, live, comprehensive *command of one's ability*, and the full *development* of one's native *resources, constitute education*."

To quote again: "A student may have a head full of facts, and come out of school as weak as when he entered. He may rank high before a Board of Dental Examiners, and yet not possess half the power of his classmate who fails. The apparently lazy and dull may be possessed of the strongest mind, the superior will, and after all be only slow in development."

College training must not be mistaken for education; it is only the preparation, the beginning of education. It is the foundation, and it should be a good foundation for self instruction, which is the greater part of one's education. A diploma, then, is only what it sets forth in the face of it, that its holder has creditably completed the course of study required by the college which gave it.

It has become in recent years quite the common practice to indulge in extravagant and at times sweeping criticisms of the work done by the schools, colleges and universities of our country. Not only is the character and extent of the instruction called into question, but we hear the quality of the material that is turned out condemned.

My efforts to discover the causes that lead to these assertions have brought the conviction that most of them are based upon a superficial investigation of the subject, and here and there an example of misspelling, poor orthography or bad logic.

The present system of sight reading, the elimination of the study of grammar, and the overloading of the curriculum, until it is almost impossible to do thorough work, are largely responsible for many of the ugly things that are said. The *system must share* in the blame if there is any. Few are good spellers—this always has been true. Hardly any one writes without a dictionary or encyclopedia, or half a dozen books of reference near at hand. Do not be hasty in judgment, then, when one under great pressure, often trying physical fatigue, makes an error, and denounce him as having "butchered the English language." Under the same strain and excitement all of us would be equally guilty.

One other charge calls for a few words. There seems to prevail among a few writers and speakers the idea that the dental colleges of America are not as careful as they might be in the selection of the character and quality of the men they are graduating; that any and all who come to their doors are accepted and graduated. During the last few months I have endeavored to obtain the figures as to the number of students matriculated for the Freshman classes in our schools, the number who withdrew and the number who failed to be advanced to the Sophomore or Junior class. Twenty-nine schools have responded to my request and this opportunity is taken to make public the returns.

Only 22 of the 29 schools sent reports that could be made use of; that is, that furnished the information that we are seeking. The blanks asked for the report for 1909-10-11-12-13, and the total number of students that were matriculated by the above 22 schools for these five years inclusive, was 6,140. The number that withdrew, 713, or 11.61% of the total. Of the remaining number, 5,427, 565 failed to be promoted, representing 10.41%. To repeat and make this clear, if I may, during this period of five years there were 6,140 young men who entered the 22 dental schools. 1,278, or 21.14% or a little more than one-fifth of the entire number, were lost out in the first year. It is probable that some of them on a second examination passed on the next session, but it is certain that not more than one-half did, and it is very clear that 11.61% of the total did not apply for advancement for the second-year work.

DISCUSSION

Dr. J. A. Gardner: Doctor Morgan has been very busy, and did not have time to put his thoughts on paper in time to let me have them, so I have not had an opportunity to consider them, but I do not believe that I could have added anything to Doctor Morgan's paper had I had ever so much time.

I am very glad indeed that Doctor Morgan has presented this subject. I believe it is a subject that we all should give considerable thought, not only the college men, but the dental profession. I believe that the system of education, especially in the South, I might say in the United States, is rather deficient. I do not believe that we are teaching in our literary schools, the public schools, sufficiently thoroughly. We find that so many have only a superficial knowledge of the fundamentals. They have not had the proper training along the line of how to acquire knowledge. They have not had the training that would develop a fertile field, and I believe that that accounts for the shortage in the numbers of candidates for entrance into dental colleges and other colleges, there being so few that are able to furnish the proper credentials, and those of them that have been able to furnish the proper credentials (I'm going to get a little off the subject right at this point, because I want to say something to the general practitioners relative to prospective students in the dental colleges), there has been a disposition to instruct the few prospective students erroneously. I mean by that that so many of the older practitioners, especially, are not familiar with the change in the curriculum, the change that has come in the last ten years; fifteen years ago it was a fact that a boy could come to a dental college, or some of the dental colleges, and get up his practical work and pass with flying colors, put in a gold filling, make a plate, and he was all right. Now, gentlemen, that day is gone. We have a great deal of trouble disabusing that boy's mind of what he has heard, that it is not necessary for him to monkey with these fundamentals, this physiology, histology, bacteriolo gy—you learn how to make a good plate, put in a good gold filling and you will get through all right. "That is to make the catalog look big and things sound high falutin." Gentlemen, that sort of talk gives a great deal of trouble for this simple reason: the boy goes there with the idea that this is a fact, and it takes you quite a little while to overcome it, and he does not realize until it is just a little bit too late, until they have passed over the kernel, you might say the foundation, especially in chemistry, and he is at a loss the balance of the term, just because he has it in his head and has been told that it is not necessary; therefore, he does not get those things that he has constantly to refer back to, and the consequences are that he makes a failure, or fails to get what he should out of the course. It is changed materially from the way things were fifteen years ago.

We have the chairman associated with us in our school, and I have heard him say often that the trouble all along the line is that we are not sufficiently thorough. As Doctor Morgan has said, knowledge does not necessarily mean an aggregation of a great many scientific facts. The man who does the great things in this world is the man who has been trained along a certain line early in life. His mind is like unto rich soil. It is good soil, and as he goes along and the seeds drop in, it is sufficiently fertile to produce good results. I would much prefer to have a young man who has very little book learning, as it is referred to at times, but who has received the lesson that he must be a student, that he must apply himself; that he must get down to business; that he must get down to the gravel bed; that he must dig it out and get it from start to finish. He may be a little slow, but when he gets the hang of the thing he goes on and he makes a wonderful man, a wonderful man.

So an education, to my mind, is very much like a sponge. If a good sponge comes in contact with a liquid, with water, and it is not already full of muddy water, or some other kind of water, it will absorb that water. If a mind comes to us that is fertile, that is, sound, that is not full of erroneous and misleading ideas, and we will just let it come in contact with thoughts and facts, it will soak it up just like a sponge soaks up water; but if it is full of the wrong kind of stuff, there is no room there for good material, and, just like a sponge, it must be squeezed out before it will be able to absorb the right kind of things.

I can not say more in regard to the paper, other than that it was a most excellent one, and I am also glad to note that Doctor Morgan has brought out the fact that we have a process of elimination in our dental work. We are not by any means taking on just any old thing, or just any old proposition. I want to thank Doctor Morgan for his paper.

Doctor Morgan (closing): I thank you, Doctor Gardner, for the kind things you have said of my paper. I do not flatter myself that I am able to add to this discussion very much, but I will take a few minutes of your valuable time, if the association will indulge me, to elaborate some of the statements made in the paper.

Some years ago I began to study the question of education. I began to realize that the whole thing was in a state of immaturity and undevelopment. Education has been nothing but a series of experiments down to this good hour. There is no one that will tell you what an ideal curriculum is, nor can anybody adequately tell what the degrees that are conferred by the various colleges mean or stand for. A.B.A. or B.S. degree or M.A. degree in one insitution stands for one thing, and quite a different thing in another; its value being given to it by the character of the instruction and the reputation the school has made as an educational institution. The character of the work of the institution is largely measured by the success of the men who come from it, rather than by any familiarity with its curriculum, or any superiority of its course of instruction. So it is with our professional schools. All of them are measured by their product. Now there is this difference that I want to call your attention to between the professional school and those that do the preparatory work, of the college and of the university.

There is today a clearing house for every professional school. There is no graduate of medicine, dentistry, law or pharmacy permitted to practice until he has gone up against the Board established by the State to determine his fitness for the profession that he has been graduated in. Here is the "clearing house" of the work of our professional institutions, and here we should come in a very large measure to find out the standing of our professional schools. There is no such place as that to determine what knowledge the possessor of a B.S., B.A. or M.A. degree has. Do you see the weakness? It is clear enough, I think, to all of you!

Now just a word with reference to this overloading the curriculum. The most ridiculous thing in the world, to me, is to pick up a catalog from a young ladies' college, or some other institution for the higher education of young ladies, and look over the requirements in what is now termed their "course in English." If the young ladies in any of our young ladies' colleges today were to do all the collateral reading that the college course prescribes, as it should be done, there would never be a single graduate from one of them, in my opinion. Their entire time spent in school would be devoted to the collateral reading, to the absolute shutting out of all other work.

Then this padding of the curriculum, this adding on additional subjects, has been indulged in until it has reached a condition where it is absolutely absurd, and constitutes one of the greatest faults in our high school system. One who has charge of our United States Signal Corps, and whose duty it is to examine the young men, who come into that branch, said to me last summer "that the poorest prepared men who came before him were high school graduates." His opinion would be worth something, as the young men who come to him are from all parts of the United States. His criticism was not limited to any particular state or section of the country.

There came to our institution last winter a young man who had been imported from somewhere in Russia. He had been in this country just three years. That young man in that three years had learned our language, had made the four full years of high school work in the Chattanooga school—the four full years in three years, and earned a living. When he was brought to me by the hand of a couple of our high school teachers they began by telling me what a wonderful bright boy he was, patting him on the back, and how marvelous it was that he had accomplished so much in three years under these difficulties, hampered by learning the language, and had to make his own living! I said to those young ladies, "The time has come when you should investigate what the curriculum was which prepared a boy who could make four years in high school in three." The fact that forced itself to my attention was that the work he had done on the other side had prepared him to outstrip our young men by one year in graduation, in spite of the handicaps upon him.

Europe has not gone mad about domestic science, painting, art, football, baseball, and every other thing that will divert and detract the attention. I think the most ridiculous thing on earth is to undertake to teach a class of young children, "Do, ra, me, fa, sol" instead of teaching them something that will be helpful in laying the foundation for a future education.

Now I will go back to the paper just a minute, and then I will close. Education is a personal matter with each and every one of us, the number of degrees, the ones that we have had bestowed on us are in most instances, I hope, *earned*, and yet the one thing that gives me most pleasure in the gathering here today is that I can say that some universities are big enough to encourage self-education, and that my dear old friend, Dr. David M. Cattell, is today to receive the M.A. degree from Ann Arbor. Ann Arbor is honoring a son, who, by his self-education, has honored her.

PYORRHEA*

BY A. CLIFFORD BRALY, D.D.S., NASHVILLE, TENN.

THE SUBJECT UNDER CONSIDERATION is of such vast extent, of such vital importance, and involves so many phases which demand minute investigation, that I wish, at the outset, to be understood as not pretending to cover the entire subject, but as endeavoring to present it in such a manner that we may be able to more readily recognize certain forms of the disorder and consequently be able to treat the condition existing, rather than to generalize all symptoms into one condition and treat it accordingly. I believe that the omissions that I shall make will be amply supplied by the gentlemen who are to follow in the discussion.

A great mistake seems to have been made by investigators of this disorder in trying to select a name for it. Nearly every man who has studied this condition has tried to give it a correct name. A great many rightfully object to the name "pyorrhea alveolaris," claiming that it expresses only a condition that is found in the disease; a flow of pus from the alveolus. While it does mean a flow of pus from the alveolus, the same thing might be true in the case of the lungs, for we might have a flow of pus from the alveoli of these organs.

Doctor Black, who has spent a great deal of time on this subject, found that in some cases of so-called pyorrhea we have a rapid destruction of the pericementum and because of which he called it "phagadenic pericementitis." Dr. Eugene S. Talbot, who possibly has given more time to and written more on the subject than any other man, objects to the term, claiming that there is a gingivitis present, which starts between the teeth in the septum of the gum under the free margin,. and has therefore called it "interstitial gingivitis," but we may have many cases of so-called pyorrhea in which there is seemingly absolutely no irritation; in fact, we find the gum anemic, rather than hyperemic, so that term does not cover all the conditions we are called upon to treat.

Another term for this disorder, which I have seen in some of the journals, the author of which I am unable to give, is "infectious alveolitis." This name would pre-suppose infection, and as we find pus in most every case, we must conclude there are bacteria, and if bacteria are at work, there is infection.

The mistake made by most of these men seems to be that they have been trying to select a name that would include every symptom and every phase of this disorder, a task I'm pretty sure never will be done correctly.

In order for one to treat a condition correctly, it behooves that individual to make a proper diagnosis, in order to get at the cause. There is, I believe, too little thought paid by our profession as a whole to diagnosis, and especially of the condition under discussion.

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*Read before the Tennessee State Dental Association, 1915.

We should not place all kinds of the so-called pyorrhea with one general class and use one definite, routine method of treatment for all cases, but we should differentiate, classify, and treat each case as an individual case, as its individual needs may require and demand; therefore, for clinical reasons at least, although it may not hold good in theory, divide the causes into at least three classes.

INTERSTITIAL GINGIVITIS

First: In this class we have Doctor Talbot's "interstitial gingivitis." There is salivary calculus around the necks of the teeth, which irritates the gum margin when we have as a result a hyperemic gum, and that gum is over-supplied with blood, exudes serum, from which a deposit forms and encircles the tooth. This serumnal deposit was therefore caused primarily by the salivary deposit, in that the patient neglected his teeth and let the salivary deposit accumulate, which, by causing irritation to the gum, produced gingivitis. In other words, the cause of this first class of pyorrhea is neglect. If there are any pockets they are very shallow. The prognosis in this condition is good.

PHAGADENIC PERICEMENTITIS

Second: The second class to which I will call your attention is a condition in which we have no gingivitis, absolutely no irritation at the gum margin. In fact, we find the gum anemic, rather than red and irritated; there are deep pockets, the peridental membrane being rapidly destroyed, pus usually present; a condition Doctor Black is justified in calling "phagadenic pericementitis."

The cause of this condition is not neglect, because this condition will occur in the mouths of patients who take the best care of their teeth, patients who will, if you tell them, come to you every month for attention, and who are ever on the alert for something wrong with their teeth. There may or may not be a deposit in the deep pockets, the pockets always being deep.

The cause of this class of so-called pyorrhea is constitutional and local, having as predisposing factors, conditions of jaw evolution, degeneracy, transitory nature of the process, and conditions of previous irritation and inflammation. The process being by nature a transient organ, and therefore accompanied with more or less inflammation, is very susceptible to any constitutional or local influence.

It has been sufficiently shown by research that there is degeneracy going on in the human race, and that there is jaw evolution, which necessarily alters the shape and form of the alveolar process. Instead of it being a short, thick and broad process, as it was in prehistoric periods, it is now a long, thin process. Its function is principally to supoprt the teeth forming and as they are erupting, broadening and enlarging, as later the permanent ones come in and still later being absorbed as the teeth are lost.

Thus we note that this process is a transitory structure, whose growth depends upon stimulation and whose absorption depends upon over- and under-stimulation. It is obvious from the fact that this process is continually becoming a weaker organ that it must be more and more susceptible to irritation. A long thin process will be more readily absorbed than a short, thick one. The laws governing transitory structures naturally place them at the mercy of under- and over-stimulation. This very structure of the process is always more or less inviting to infection, or invasion of microbes, which aggravate the effects of this under- and over-stimulation and this is increased by local results of constitutional defects such as idiocy, paretic dementia, etc., as well as the results of injuries to the jaw or teeth.

When more work is required of one or more teeth (as when by loss of one or two teeth the adjacent teeth drift together out of their normal position, resulting in malocclusion; when plates are attached to teeth, or bridge work is adjusted), this structure, of which the alveolar process is composed, predisposes inflammation about the roots of teeth thus affected.

When little work is done by the teeth (as in cases of irregularities, when antagonizing teeth have been extracted, or in mouths of idiots or people otherwise affected who are unable to use their teeth), under-stimulation also predisposes inflammation.

Tartar is an active source of irritation and inflammation of the gum margin. This inflammation extends through the capillaries to the process. Lack of contact points, illy-fitted bands of crowns, poorly polished fillings, etc., are sources of inflammation to the process, as slight irritation only is needed to produce absorption. It is not astonishing then that this unmistakable condition prevents successful implantation of teeth and that in no great length of time we will, for the same reason, be seeking some means of replacing teeth other than with fixed bridge work.

The prognosis of the treatment of this class of pyorrhea is not any too good, especially if the case has progressed until the deep pockets are present, the flow of pus from alveolus and a rapid destruction of the membranous linings around the teeth is taking place, whereby there is a considerable loosening of the teeth.

Third: Under the third class we will place those cases which are few and far between, nevertheless we sometimes find them in practice. This is a condition wherein there is no break at the gingiva, no opening into a supposed pocket on the side of the root, and associated with this condition is neuralgic pain. We are unable to find anything the matter with the tooth. We do not suspect pulp stones, nothing seems to be the matter with the pulp, nor do we suspect an abscess, in all of which conditions we would have neuralgic pains, but we find on the roots of some teeth a deposit accumulated where there is no break or visible opening of the gum leading to it. There is no gingivitis, as yet no pus, no rapid destruction, still there is a deposit and neuralgia.

Upon questioning the patient we will more than likely find out that the patient is of a rheumatic diathesis and has a predisposition toward gout and rheumatism.

The prognosis in these conditions is fairly good. Stir up the kidneys, correct faulty metabolism and remove the local irritant and the case will ordinarily clear up.

GENERAL TREATMENT

For the first class, the treatment is purely local, but the process of proper elimination will benefit all cases, and for the second and third, both local and systemic treatment. The clinical history of pyorrhea alveolaris is essentially that of any other disease of the mucous membranes. The disorder responds quickly to treatment at its outset.

Later, its complications and the extent of structure involved render treatment very inefficacious and always insures the loss of the tooth. (Talbot.)

Before going into detail as to treatment of the classes mentioned, I would like to mention a general procedure to be employed, inasmuch as there are certain things we do in the treatment of all three of the classes.

CO-OPERATION OF THE PATIENT

This is a matter of very great significance in the treatment of the trouble. The first thing to do is to impress your patient with the fact that if you undertake to treat the case, he must follow your directions to the letter, keep his appointments, etc. Unless we can get this co-operation I feel that it is best to let the patient go to the dentist across the street, rather than treat the case and fail, which I most assuredly would do if the patient did not follow my instructions.

HOPELESSLY LOOSE TEETH

Talbot says, "If the alveolar process be so absorbed that the tooth has become loose, that tooth is hopeless." In such unstable tissues, especially when inflammation extends through the process and lacunæ, perforating canal absorption, reversal of the order so as to set the osteoblasts to tissue building, is hardly to be expected.

We do not want to treat this tooth for three or four months and then have to extract it, but we must have some scientific basis on which to place our diagnosis and act accordingly.

STATION LOOSE TEETH IN THE JAW

Many of the teeth in the first and third classes and all in the second are loose but are not hopelessly so, and the thing to do is to station them in the jaw. Loose teeth add a very efficient irritation, which increases the extent of and intensifies the inflammation. I will not go into the various means and appliances by which this can be done, but only emphasize the importance of doing it.

It seems to me that if we can find out the real etiology of this disease, which causes more teeth to be lost than all other dental diseases put together, and tell our patients to follow out certain lines of treatment, with our help, they can prevent the necessity of having the teeth treated for the cure of this disease, we would be rendering better service; not like the Doctor who said (when asked what the cause of the disease was) that he did not know and did not care, that all he wanted was to be able to cure it. "To illustrate: If a man were to fall off his bicycle to the street and break his leg, you would not stop to ask him how he happened to fall, but would go to work and set his limb in order that it might get well." It seems to me that if one had known that the man riding along the street on his bicycle was in danger of falling, the best service he could have rendered him was not to set the limb after it was broken, but to warn him previous to his accident, thus avoiding the necessity of setting the limb. Therefore, if the first class of the disorder were attended to early, or better, if we could so control our patients as to keep in touch with them and see that their mouths are not being neglected, we would save having to treat a large percentage of these cases.

REMOVING DEPOSITS

The first thing to do in the treatment of any one of these classes of pyorrhea is to remove the deposits, if there are any, and there are always deposits in the first and third classes and usually a deposit in the second class.

Whenever there is a deposit, it is necessary to remove it. It is asserted by various authors that by injecting certain acids into the pockets we can soften the calcific material, which we loosely term a deposit, and at a subsequent sitting easily remove it. The calcific deposit is practically as hard to dissolve as are the inorganic constituents of the cementum itself. If this be true, it seems to me to be calling upon our imagination to believe that an acid sufficiently strong to soften or dissolve the foreign material, which has accumulated on the root, without the acid at the same time acting deleteriously upon the cementum and soft tissues. The best acid to use in the removal of these deposits is, to my mind, a steel instrument.

In the first class where the deposit is simply under the free margin of the gum, no pocket (if any, a shallow one) we should be sure not to injure the peridental membrane. Also in the third class, we should be careful not to injure this membrane; but in the second class, where there is such rapid destruction of the membrane, deep pockets in which you can insert the instrument almost to the end of the root, you need not take any precautions not to injure the membrane. In this class it does not make any difference, because subsequently we want to go down in that pocket with a caustic and stir up the tissue thus affected; and the more this sluggish, now rapidly-destroying membrane is stirred up and the more hemorrhage is caused, the better the case will heal.

MEDICINAL TREATMENT

After the deposits are removed, we have three things to accomplish by the use of drugs:

First: Disinfect the area.

Second: Stimulate not only the gum, but the peridental membrane.

Third: Constringe the gum.

In the first class the inflammation will usually clear up after the deposits are removed and tincture iodin used on the gum at the points of irritation; however, if there is very much inflammation, or shallow pockets, as there sometimes are, the gum should be sprayed with an antiseptic solution and stimulated with a stronger solution of iodin the secretion around to normal state.

TREATMENT OF SECOND CLASS

In the second class the pockets should be mechanically cleansed with an antiseptic solution or a normal salt solution, with syringe made for the purpose, following which we are now ready to stimulate the tissue and constringe the gum. For the purpose of stimulating the tissues, we use an acid. There are a great many different acids used and of varying percentages: lactic acid, 75%; trochloracetic acid, 5 to 7%; phenolsulphonic acid, 25%; sulphuric acid, 2 to 3%. Any of these are good; all will stimulate and that is what we want.

CONSTRINGING

To constringe the gum, especially if it is a case belonging to the second class, you want to use an agent that will reduce the bulk of gum tissue and cause it to draw closer to the neck of the tooth, closing up the pocket.

The best preparation for the purpose is one, I believe, Doctor Adair uses, which can be made in your office by you or your druggist can make it. It is a saturated solution of iodin crystals in bichlorid creosote. In order for this to be more efficacious it is covered by a coating of glycerol of tannin, which you can also get at your druggist's. The latter serves not only the purpose of keeping the saliva from diluting or washing the medicine off, but keeps the pockets free from infection for twenty-four hours. You never need to use the acid solution in either the first or third class. You need to stimulate the tissues by means of an acid only in the second class of cases, wherein there is a rapid destruction of tissue and a deep pocket.

The question has arisen of late whether there exists a specific germ for this disease or not. In the light of research made by Talbot, Patterson and others, this stage of pyorrhea is merely due to pyogenic germ infection of the already diseased gum. No special germ has been found which complies with the laws of Koch (which compels production of the disease by the alleged specific germ). However, pathological evidence demonstrates that bacteria play the very subordinate role in this disease that they do in any ordinary wound infection. It has been claimed also that certain alkaloids of ipecac are a specific for pyorrhea in that it destroys the amœba. As is shown above that this disease is not caused by the amoeba (or else it has not been proven that it is the specific germ), one could hardly expect this drug to be of any more benefit in the treatment than to destroy the amoeba, which, by its physical presence, serves as an additional irritant.

We note that extreme hyperemic gums are greatly improved by its administration, but as to checking the destruction of tissue around teeth thus affected, it has been of no avail.

Lastly, in the treatment of the first two classes, we find that the cooperation of the patient is of great value; in fact, a necessity. While the treatment is being done by the dentist, we should instruct the patient to massage the gums, use a mouth wash and brush not only the teeth, but the gums as well, and in instructing them upon this point, tell them never to brush the teeth and gums backwards and forward; but, with a stiff brush having uneven bristles, they should brush the upper teeth up and down and with a sweeping motion, and the lower ones up. Massage of the gums is one of the most important features of the treatment, therefore instruct the patient to massage at least once a day, and I find that the best time for this is just before retiring. A good astringent paste should be used by the patient, not only for brushing the gums and teeth, but for massaging also. In addition, the patient should use a mouth wash, because one of the essential features in the treatment of this disorder is to keep the mouth as clean as it is possible to do.

Third Class—while I believe that nearly all cases of pyorrhea may be thrown into two classes, you will find that occasionally there is a condition wherein we have deposits on the roots of the teeth with no break at the gingiva and at times, no pockets leading to the deposit, and usually being associated with neuralgia. I believe then that we are justified in dividing the cases of pyorrhea into three classes and the third class demands not only the same kind of treatment locally as do the others, but in conjunction with that we must, if we would get the best results, treat the case or have it done systemically. In this class the treatment is the same as for the other two classes, and it is to the systemic treatment I wish to call your attention now.

Before doing so, however, I want you to appreciate the condition about the teeth which are conducive to the possible formation of deposits from the blood proper.

The membrane which stands between the alveolar process and the cementum of the root is a ligament as well as a membrane. It is a ligament for the reason that it stands between two bony structures. There can be no question about it being a membrane; it is well supplied with blood, it has all of the characteristics common to a ligament. It stands between the alveolar process and the cementum of the root of the tooth, the same as does the ligament which stands between the joint of the shoulder, knee, etc. The circulation is slow and sluggish in the capillaries of the general circulation system, and it is the slowest and most sluggish in the ligaments, especially is the circulation slow and sluggish in the ligament which stands between the cementum of the root on the one hand and the alveolar process on the other. If that is true, and there is in the blood because of a suboxidation process, certain things which ought not to be there, those substances which are in the blood are liable to precipitate or accumulate in the ligaments as the blood slowly passes through, and that is what Kirk and Pierce and a great many other men believe takes place.

There are three kinds of food from which the body builds up the tissues: proteids, carbohydrates and fats. The food which forms the waste products of the body, which waste products are supposed to be eliminated by the kidneys, is the nitrogenous or proteid food. It is well to remember, then, that if the blood is charged with certain solids that ought to be eliminated by the kidneys, they are not eliminated for one of two reasons: either because of the lack of oxygen, a suboxidation process, whereby the effete material is not oxidized into something that the kidneys can throw off, or there may be a sufficient amount of oxygen and not this suboxidation process in the tissues, yet the blood is charged with this effete material which should be eliminated by way of the kidneys, and it is not because the kidneys are not performing their proper function.

In all cases of rheumatism and gout you will find that there is faulty metabolism somewhere in the system. It may be that the kindeys are not performing their proper function, it may be that some organ is out of order; faulty metabolism is going on in that particular organ and if this goes on long enough in any one organ, sooner or later all organs will be more or less affected, and from faulty metabolism in some specific organ we will have faulty metabolism in general.

To combat the idea that there are in some cases deposits on the roots of the teeth because of faulty metabolism and lack of oxidation of nitrogenous substances, the men who are prone to see in oral filth and bacteria the cause of all kinds of pyorrhea, say that if this is a local manifestation of a constitutional disorder, as some claim it to be, why will the pyorrhea in every case get well if we extract the tooth? This is the greatest argument advanced by the men who claim pyorrhea to be a purely local disease. If you had rheumatism in your elbow and as a result of this the joint became stiff, you could cure the rheumatism in that joint if you would cut the arm off at the elbow; you could cure the rheumatism so far as that joint was concerned. Why? Because you have broken up the joint. When, by the extraction of the root, the joint is broken up between the root of the tooth and the alveolar process, the pyorrhea is cured so far as that tooth in concerned, where the constitutional disease can be manifested locally. So there is nothing in this argument, the only one these men advance in support of the theory that pyorrhea is never associated with rheumatism or gout.

We know that the large percentage of cases of pyorrhea, eighty at least, that we are called upon to treat, are due either to neglect on the part of the patient, or to something which causes a rapid destruction of the alveolo-cemental membrane.

SYSTEMIC TREATMENT

The systemic treatment consists in bringing about three conditions: *First: Regulating Diet*—If these deposits are formed on the roots of the teeth because of an insufficient amount of oxygen to oxidize the nitrogenous material into substances which can be thrown off from the system by way of the kidneys, one of the ways to treat pyorrhea associated with this constitutional disorder is to lessen the amount of nitrogenous food taken into the system. To do this, you will have to regulate the patient's diet. With this end in view, you will advise the patient to eat less foods which are rich in proteids, and more of the foods which are rich in carbohydrates and fats, especially the former. If you honestly believe you are treating a case of pyorrhea, associated with the rheumatic or gouty diathesis, it is your duty to suggest to the patient that he eat less meats, and more of this class of foods: succulent fruit, the white meat of chicken, fish, rice, etc.

Second: Stimulting Metabolism—After regulating the patient's diet by means of which we will lessen the amount of nitrogenous food taken into the system, we will stimulate metabolism. If there is an organ which is not performing its proper function, it is our duty to stir up or stimulate that organ to increased activity, as the result of faulty metabolism, suboxidation processes go on, and we have the suboxidation processes because of the lack of oxygen. That being true, the thing we will have to do in order to stimulate faulty metabolism is to advise the patient to take healthful, vigorous exercise.

Third: Increasing Elimination—You have tried to lessen the amount of proteid material taken into the body; you have advised your patient to do that which will stimulate faulty metabolism, and the third thing to do will perhaps suggest itself to you. It is to refer the patient to his physician for something to be taken internally to aid in the elimination of those products which are not eliminated.

There are two classes of salts which are especially indicated in the treatment of rheumatism and gout with which is associated this local manifestation, pyorrhea alveolaris. These two classes of salts are potassium and lithium salts. They are especially indicated for the reason that both classes of salts are diuretic, both will, therefore, stimulate the action of the kidneys if they are not performing their proper function. Those salts, given in the proper dose, will stimulate the kidneys to greater activity, and if we stimulate the action of the kidneys by giving a diuretic, we will aid materially the elimination of more of the effete material, which should be eliminated, but which is not because the faulty metabolism exists in those organs.

NEURALGIA

There are two more things we can do. I have told you that this condition is often associated with neuralgia. If it is, besides administering a diretic, you can give something to allay the neuralgic pain. You never saw a case of rheumatism unless there was faulty metabolism in some organ, and you never saw one organ fail for a considerable period to do its full and plain duty without some other organ becoming more or less affected. In other words, any one with rheumatism is more or less run down because of the fact that one organ has failed to do its duty, and as a result all the organs have become more or less affected. The same thing is true in neuralgia.

There is a lesion somewhere, something is wrong, and quite often that something which is wrong is nothing more nor less than the fact that the patient is run down, and all the tissues of the body, as well as several of the organs of the body need toning up. Then, when neuralgia is associated with this disorder, it is probably true that the patient needs to be toned up and should have a tonic. In conjunction with the tonic, you can give a nervine to allay the pain.

SOME DENTAL HINTS

BY DR. J. B. KELLY, POLLOCK, LA.

An Emergency Water Syringe. Every dentist will find himself at some time with a leaky water syringe bulb and cannot wait to order another. Here is a remedy: Take off the old bulb, go to a drug or notion store, secure a five-cent rubber ball. With a cylindrical bur cut a hole, more oblong than round, in the ball, put vaseline around the opening, press in the part and screw on the nozzle. You have made your syringe useful again.

To Prevent Plaster Adhering to Teeth when taking impressions for crown and bridge work, take a cotton ball, dip it in vaseline and apply over and around the teeth, just as you are ready to take the impression. You will find that the impression comes off easier and is not so liable to fracture in removing.

Pulp Devitalizer. Use morphine acetas, gr. x; arsenous acid, gr. v; tannic acid, gr. x; m. et trit. Sig.: Take a very small cotton ball in pliers and saturate ball with carbolic acid. Draw this lightly through the mixture and enough will adhere to devitalize the pulp in seven or eight days and will be painless. *Don't use too much.*

THE STERILIZATION OF DENTAL INSTRUMENTS

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(*Continued from page 50, January Summary*)

Probably many will challenge the statement that engine hand pieces can be boiled. This statement is made only after having procured a right-angled hand piece, boiled the same, and tested its sterility, then contaminated it with a fluid culture of bacteria, and again boiled it and tested its sterility. After completing the experiments with it for the day it was placed in 95 per cent. alcohol to remove the excess of water, and in several instances left in this fluid overnight. It has been boiled repeatedly and frequently exposed to 80° in a water bath, yet it has shown no bad effects as a result of such treatment, except the removal of the lubricant from the mechanism. It can be oiled in a few seconds and its mechanism will run as smoothly as before. These hand pieces could be made with oil holes at the proper points so that the oiling would be much facilitated.

This instrument is one which dentists have usually considered non-sterilizable; consequently it has received very little efficient sterilization. Marshall(12) states that hand pieces can be sterilized by immersing them in gasoline and then in alcohol; but my experiments with sterilization by anhydrous liquids have given disappointing results, even with instruments of simple construction. Furthermore, the effect of gasoline and alcohol on the lubricant will be practically as complete a removal of the oil as when boiled, so that oiling of the piece would be necessary after each sterilization.

In sterilizing hand pieces, heat will reach infection in parts of the instrument where cold solutions cannot be effective, on account of the oil present, and where gas does not penetrate. With heat, the metal itself is raised to the temperature of the surrounding medium, so that the organisms are attacked from all sides; while with solutions or gases more or less of their surface is protected.

In seeking a method of sterilization for hand pieces, several methods were tried, designed to obtain sterilization without the introduction of water into the instrument. As stated above, the gasoline method did not sterilize rapidly and completely. Immersing in a fixed oil, liquid vaseline, was then tried, placing this in a steam chamber and raising the temperature to 100° for one hour. This proved inefficient, because the heat is only the equivalent of 100° of dry heat, the instrument being in an anhydrous fluid. As a last resort I turned to moist heat by the method of boiling, or an 80° water bath, in 0.25 per cent. sodium hydroxide and then removed the excess of water by absorbing it with alcohol. This gave the desired result.

All of the above mentioned instruments may be submitted to 80° in a water bath without any injurious effect on the instruments. Mouth mirrors may also be sterilized by this method without injuring them. This was determined by obtaining several new mirrors, contaminating them, and then placing them in 0.25 per cent. sodium hydroxide solution at 80°. Sterilization was accomplished in 3 minutes, though the mirrors were frequently left in the bath for a much longer period, 10 to 60 minutes. The test of the effects of this treatment was made by handing the sterilized mirrors, together with a new mirror of the same lot that had not been sterilized, to other persons and asking them to pick out the one that had not been sterilized. Everyone acknowledged his inability to determine any difference.

Boiling, or heating to 80°, the rubber bulbs of chip blowers, and the face piece of the gas inhaler, will shorten the life of these articles. It is believed, however, that the increased expense due to these rubber fittings will not be great enough to work any hardship on the dentist. It certainly will not be as great as the cost of rubber gloves used by the average surgeon; and at present nearly every surgeon uses rubber gloves and insists on their sterilization by boiling. The dental surgeon should not be content with a lower grade of work, nor deterred by the small sum necessary to replace articles which have been worn out a little sooner by reason of improved methods in his practice.

The instruments considered above, which can be sterilized by boiling, include the greater portion of those used by the dentist; except those whose cost is so slight, or whose usefulness so impaired after using once, that they can be thrown away.

This list includes:

Polishing points and disks.
Rubber dam.
Nerve broaches (these may be sterilized by heat if desired).
Bristle brushes.

Mounted stones must be treated according to their construction and composition. Carborundum disks, wheels and stones, which are bonded with porcelain, can be boiled without injury. Those made with rubber as the adhesive base can not be heated. Their sterilization can be accomplished by use of a phenol solution followed by alcohol. Corundum stones can not be boiled, so the phenol solution should also be used on these. Stones mounted on a mandrel by a cement or shellac can not be subjected to heat, while those mounted by metal devices can be boiled, provided their composition allows such treatment. Inasmuch as many of the stones and disks must be sterilized without heat, it is permissible to sterilize all stones by immersing in 5 per cent. phenol solution for one hour, to be followed by immersion in alcohol to remove the excess of phenol solution.

Tortoise shell, and instruments of similar composition, which might be injured by heat, should be immersed in phenol solution, as are mounted stones. Mouth mirrors may also be sterilized in this manner, if not subjected to 80°.

The life of a mouth mirror, however, depends entirely on the efficiency of its construction in keeping fluids of any kind from the amalgam surface of the glass. As long as this can be kept dry the mirror is clear. When it becomes wet by any fluid, either water or saliva, it becomes cloudy, consequently a well-constructed mirror is the cheapest in the end.

This method may also be applied to instruments whose composition must be other than metal, on account of the discoloring effect of metal on cement, or for other good reason.

However, barring the few instruments whose chemical composition is such that a serious change in character would result from heating, all instruments should be sterilized by heat, and no instrument made of material that is destroyed by heat should be allowed in the instrument case, if the same instrument can be made of thermostabile matter.

I have seen some dental instruments with rubber handles which have been boiled repeatedly, with no bad effect except discoloration of the rubber. These, however, had a central metal shaft supporting the rubber, to prevent bending when heated. While this construction permits the boiling of rubber-handled instruments, it can not be said that rubber handles are as acceptable from an aseptic viewpoint as are all-metal instruments. Of course, instruments whose cost is so slight that they are used once and then discarded do not require sterilization to prevent transfer of infection from patient to patient.

OTHER SANITARY MEASURES

The following suggestions relating to dental asepsis, while not strictly within the subject of sterilization of instruments, are given as contributory factors in improved office sanitation:

Cuspidors are a necessity in a dental office, and the problem of keeping them in sanitary condition is a difficult one. The installation of the fountain cuspidor has been a great improvement over the old metal or earthen bowls which were so hard to keep clean. To those dentists who still have the old type of cuspidor, on account of lack of running water or for other reason, I would recommend at least daily cleaning, with a broom or stiff brush and water. This is to be followed by placing the cuspidor in a bucket, covering it with boiling water and leaving it there for at least one hour. It would be well to have several of these, so that a clean one can be put in use for each patient while the others are being cleaned by assistants or charwomen. In offices having the single-bowl fountain cuspidor, with bowl that can not be removed, flushing with hot water and antiseptic solutions is our main effort in sterilization. All fountain cuspidors should be fitted with both hot and cold water, so that the hot water can be used for cleaning the bowls after each patient is dismissed. Those having bowls that can be removed can have the bowls immersed in antiseptic solutions, or may even be boiled in a large container. However, absolute sterility of cuspidors is not of vital importance, provided a high degree of cleanliness is maintained. It is well, however, to have these articles of equipment installed so that complete sterilization can be carried out in case an unusual infection, such as diphtheria, is encountered.

The possibility of the operator transferring infection to the cable of the dental engine above the hand piece, and then later from the cable to another patient, has been mentioned. If the cables have the power-transmitting mechanism inside a covering, this can be avoided by a simple sterile or clean cotton sleeve, with a draw string in each end, which can be slipped over the cable and tied after the hand piece is in place, so that the whole cable is covered down to the sterile hand piece. This allows the operator to handle the cable at will during his operation, and, when a second patient is treated, a second clean sleeve is put on in place of the first one. It is also probable that a flexible metal covering, of tubing such as is used for conducting gas to lamps, might be constructed so that this could be removed and sterilized by heat. This is not applicable to engines which transmit the power from engine head to hand piece by open cord belt.

The use of foot levers for turning on the flow of hot and cold water in the washbowl is a great convenience to a busy operator who desires to keep his hands sterile. The use of a clean washable covering for the operating chair is a step in the direction of asepsis and cleanliness. The headrest should have a clean linen cover, renewed for each patient.

There should be toilet facilities for patients and, in addition to the usual lavatory equipment, a dental bowl, like that seen on Pullman cars, so that a patient may brush his teeth without doing so over the washbowl.

To place the patient's mouth in as clean condition as possible, each patient should brush his teeth, preferably immediately prior to coming to the chair. This should be followed by a thorough rinsing of the mouth with some good mouth wash. This procedure is a mechanical cleansing, aimed primarily at the removal of spores from the field of operation, though many other organisms are removed at the same time.

In order to do this the dentist should have a supply of tooth brushes on hand and, if necessary, supply a new brush to each patient. This may be the patient's first encounter with the oral hygiene educational movement, but I believe it will be productive of good. I believe that the dentist should add the cost of the brush to the patient's bill, unless brushes can be obtained at so low a figure as to make their free distribution practicable. A supply of mouth wash should be on hand in a convenient place for use by patients.

Paper drinking cups and paper, or small individual, towels for patients should be furnished. The common drinking cup and towel are abolished on all interstate carriers, and in hotels and public places in many states. It is, therefore, fitting that the members of the medical and dental profession should apply the spirit of these laws to their own establishments, even though the letter of the law does not require it.

Clean linen direct from the laundry is not sterile, but offers only the remotest chance for transmission of infection through it. Sterile linen is desirable and for a busy dentist, apparatus for its sterilization will be a great addition to office equipment. Steam pressure sterilizers are preferable for this, though other types may be used.

SUMMARY

As a result of the experiments and investigations detailed above the writer reaches the following conclusions and recommends the following methods for sterilization of dental instruments:

CONCLUSIONS

1. Moist heat is our best disinfecting agent for the sterilization of all metal instruments.
2. For the destruction of nonspore-bearing bacteria, moist heat at 80° is nearly as efficient as boiling, and for practical purposes can be used in place of boiling.
3. Instruments constructed of metal, whose complicated mechanism has heretofore caused them to be considered as nonsterilizable, can be sterilized by moist heat, provided the water is removed from them by immersing in alcohol subsequent to sterilization.
4. Instruments, whose construction does not permit of boiling, can be sterilized by chemical disinfectants.
5. There is need for more practical instruction in dental schools and clinics in the methods of sterilization, and the subsequent testing of the same by bacteriological methods.
6. Dentistry, which is a highly specialized branch of surgery, should use the two factors, asepsis and anesthesia, which have made possible the wonders of modern surgery, with skill and precision equal to that of surgeons.

RECOMMENDATIONS

1. That all instruments and appliances be rendered mechanically clean by washing in water with a brush or sponge.
2. That the following instruments and appliances be boiled or submitted to 80° in a slightly alkaline solution (0.25 per cent. sodium hydroxide):

Artificial teeth used in matching and measuring.
Broaches and their holders.
Burnishers.
Burs.
Chip blowers.
Chisels.
Drills
Excavators.
Explorers.
Files.
Forceps, extracting.

Forceps, foil.
Hand pieces for engine
Impression trays.
Knives and lancets.
Mallets, hand and automatic.
Mixing slabs.
Mouth gags.
Mouthpiece of saliva ejector.
Pliers.
Pluggers.
Pyorrhea instruments.
Polishing points and brushes (if not discarded after using once).
Reamers.
Root elevators.
Rubber dam clamps and forceps for same.
Rubber dam weights and metal parts of holder.
Saws.
Scalers.
Scissors.
Scratch wheel on head of engine.
Spatulas, metal.
Syringes, hypodermic.
Syringes, water.
Tongue-holding forceps.
Mirrors (if 80° bath be used, but not to be boiled).

3. That instruments in the above list whose mechanical construction makes it difficult to remove the excess of water are to be placed in 95 per cent. alcohol for 10 minutes to remove water, then removed and allowed to dry.

4. That only instruments with metal handles be used by dentists desiring to follow this method.

5. That the following instruments be sterilized by immersion in 5 per cent. solution of phenol for at least 60 minutes:

Mounted stones.
Tortoise-shell instruments.
Mirrors (when 80° bath is not used).
Other instruments not of metallic nature and which can not be replaced by metallic instruments.

6. That instruments, after using, be placed in a fluid medium, preferably clean water, to avoid drying of infectious material and to facilitate their mechanical cleansing.

7. That no instrument or appliance, used on a patient directly or indirectly, be used on any other patient until recommendations 1 and 2, or 1 and 5, as the case may be, have been complied with.

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A REVIEW OF SOME DRUGS OLD AND NEW*

BY DR. S. F. M. HIRSCH, D.D.S., CLEVELAND, OHIO

AT THE PRESENT TIME much is said and written of the crime of over-medication. The pendulum seems to be slowly swinging to drug nihilism. Prinz says: "Therapeutic nihilism is just as erroneous as the polypharmaceutic shotgun prescriptions of our ancestors."

A review of the leading dental journals of the past few years will show great progress in almost all branches of dentistry and comparatively little in dental therapeutics. Prinz, Buckley, a few who have investigated local anesthetics and a number of workers in the field of serum therapy constitute almost the whole list of scientific contributors. A further review of the advertising pages will show where many members of the profession obtain their knowledge of modern therapeutics. In positive terms—in glittering generalities and especially in the use of that much abused term, "coal tar derivative"—the virtues of this and that are glowingly set forth.

We can reasonably expect the research commission of the National Association to largely increase our scientific knowledge of drugs, their action and application. Until that time much of our medication will be empiric. To eliminate the unscrupulous we can hope to see established some day a committee on new remedies similar to that of the American Medical Association. This committee investigates all new remedies. If, after investigation, they are found worthy, they are placed on an approved list. Many preparations that do not possess a positive value or whose virtues have been over-stated by the manufacturers, have been forced off the market. Few manufacturers would have the temerity to market a remedy of doubtful value in the face of an adverse report from our committee backed by our association with a growing membership of over thirteen thousand.

Therapeutics is the science that deals with the application of drugs or remedies to the treatment of disease. Empiric therapeutics is the application of remedies based solely on clinical experience without regard to their physiologic action. Rational therapeutics is the treatment of disease by the use of remedies which, from a knowledge of their physiologic action, are expected to act upon certain pathologic conditions. Nature possesses as an inherent quality the power of re-establishing normal conditions. We cannot expect more from a drug or remedy than that it should assist nature to correct a morbid condition. With these simple facts in mind I would have you review a few drugs with me before casting them all aside.

With the exception of local anesthetics, they have not been grouped, they have been chosen at random. As much as possible of the physical description of drugs already familiar has been omitted.

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*Read before the Cleveland Dental Society.

Excepting only the much-abused antiseptics, local anesthetics are more used by the dentists than any other drug.

Aethylis Chloridum—Ethyl chlorid is a refrigerant local anesthetic. It has an agreeable odor and a pleasant taste boiled at 55 degrees F. It is a liquid at a very low pressure. In opening abscesses and in extraction of loose teeth this chemical is invaluable. It avoids the danger attendant upon the injection of a local anesthetic where pus is present. The anesthetic effect lasts long enough for a short operation. The tissue to be anesthetized should be dried and the surrounding parts should be protected by rolls or napkins, especially the crowns of teeth. The container should be heated in order to completely vaporize the liquid. Holding the tip of the tube an inch or two away, the spray should be continued until frost crystals appear. Instruct the patient to breathe through the nose to avoid inhalation and possible light general anesthesia.

Cocainæ Hydrochloridum, U. S. P.—Cocain hydrochlorid was really introduced to the medical and dental world by Koller, of Vienna, in 1884. Local anesthesia can almost be said to date from this time. The production of anesthesia depends on the decomposition of the cocain, the products combining with protoplasm of the cell. It is a protoplasmic poison, acting deleteriously upon all tissues, not especially upon nerve tissue. As this is the medium of sensation and expression, its effects are more noticeable. Anesthesia will last as long as the cocain remains in contact with the nerve endings—with the weak solutions now in general use, about fifteen minutes. This can be considerably lengthened by the addition of adrenalin or suprarenin synthetic in small amounts. It should be remembered that the relative toxicity of a given quantity of cocain solution depends upon the concentration of the solution. It has been clearly demonstrated that a fixed quantity of cocain in a five to ten per cent. solution is almost equally poisonous as five times the same quantity in a one-fifth per cent. solution. Cocain should not be used in conductive anesthesia. Laxness of the tissues, and its quick absorption into the system, contra-indicate this. It is a powerful vasomotor constrictor, the anemia produced being later followed by congestion. This makes it unsuitable for dressing painful wounds. Its specific action is manifest by paralyzing the sensory nerve endings. In small doses it produces rapid pulse and increased respiration. In larger doses it paralyzes the centers of respiration. No maximum dose can be stated. One-fourth grain is generally considered safe. The following formula I have found very satisfactory:

Cocain hydrocld	gr. 10
Sod. chlor.	gr. xii
Acid boric	gr. v
Aqua distillata	qs. 4 oz.

When using add two drops of solution adrenalin to each syringe full. This makes a solution that is practically isotonic. Billets containing one twelfth grain of cocain for pressure anesthesia will be found convenient as well as giving a measured dose. On account of its more rapid action and because very little gets beyond the apex of the root, cocain is superior to novocain for pressure anesthesia. With our present technic and knowledge of its action on the tissue the untoward symptoms formerly manifested have been practically overcome. Buckley says: "Cocain stands today with scarcely a rival as a local anesthetic, notwithstanding the many attempts to displace the drug by the products of manufacturing chemists."

Novocain—Novocain, discovered in 1904, is the hydrochloric salt of the synthetically prepared alkaloid. It is a white crystalline powder or a colorless needle shape crystal, melting at 156 degrees C., incompatible with alkaline carbonates and iodides. It dissolves in an equal amount of cold water, giving a neutral solution. The solution must be kept in alkali-free glass as water slightly dissolves glass. It has an equal amount of anesthetizing power compared to cocain. It does not reduce the vasomotor constricting power of adrenalin. Braun, in his classic researches on local anesthetics gives these requirements for an ideal local anesthetic: *First*, while equally effective, doses must be less toxic than cocain. *Second*, it must be absolutely indifferent toward tissue; it must not interfere with the healing process. *Third*, it must be readily soluble in water; it must be stable and must permit of reliable sterilization by simple means. *Fourth*, it must allow of the addition of adrenalin without interfering with the vaso constricting power of it. *Fifth*, when applied to mucous membrane must possess ready penetration.

Novocain fulfills these requirements more nearly than any drug we have at the present time, and is six to seven times less toxic than cocain.

Prinz suggests the following formula:

Novocain	gr. x
Sodium chl.	gr. iv
Aqua distillata	dr. I

℞

If tablets are used, boil six-tenths per cent. stock solution of NaCl in a porcelain dish for two minutes. Add tablets and again bring to a boil. Tablets containing NaCl do not keep owing to the hydroscopic nature of the NaCl. They should be avoided. When tablets show the least discoloration they should be thrown away. Exposure to the air has caused them to deteriorate. Novocain acts slower than cocain. Novocain is a sedative for painful wounds and will be found superior to orthoform. Novocain up to one gm. has been recommended as safe.

Adrenalin—The alkaloid isolated from the desiccated suprarenal glands. This is not an anesthetic, but owing to its value in connection with local anesthetics should be considered here. It is a grayish white powder slightly soluble in cold and more soluble in hot water. The hydrochlorid in solution 1-1000 in physiologic salt is most used. It is preserved with small quantities of chloretone, thymol, etc. Even then it does not keep. On exposure to the air it is easily oxidized, becomes pink, red, and finally brown, when it is worthless. Stolz has prepared a synthetic adrenalin, the hydrochlorid of which forms a stable salt which permits of boiling. Adrenalin, when injected, raises arterial blood pressure, acts as a powerful vaso constrictor by stimulating the smooth muscular coat of the blood vessels, thus producing local anemia. This anemia, by decreasing the rate of absorption, prolongs the effect of the local anesthetic as well as decreasing its poisonous activities due to its slower absorption. This (synthetic) is more stable and like all synthetic alkaloids, is less liable to be contaminated by impurities. Adrenalin is of doubtful value as a hemostatic in dental practice. The maximum dose should not exceed five drops in 1-1000 solution.

Eugenol, U. S. P.—Eugenic acid, an aromatic phenol, obtained from various essential oils, chiefly oil of cloves, possesses antiseptic, stimulating and local anesthetic properties. It is a splendid anesthetic in pulpitis. The combination of this acid with certain esters forms a base on which an important group of local anesthetics have been formed, namely: orthoform, anestheium, novocain, etc. Buckley recommends eugenol in non-septic pericementitis. After flooding the root canals it is evaporated by the warm air blast. Eugenol in combination with chloretone, twenty-five per cent., will be found especially effective in stubborn pulpitis.

Aqua Hydrogeni Dioxidi—When brought in contact with bacteria and its products it acts as a powerful antiseptic and deodorant by its reaction with the living cells; it splits up into O and H_2O. The nascent O thus liberated readily oxidizes the surrounding substances. The liberated O destroys the delicate structure of healthy granulations in healing wounds. It is largely used by the laity as a mouth wash. This should be discouraged as the amount of free acid present in most commercial preparations has a destructive effect on the enamel. The use of H_2O_2 to check the hemorrhage after pulp removal is particularly to be avoided as it combines with the iron in the blood, forming compounds which will eventually discolor the tooth substance. While H_2O_2 is considered an ideal antiseptic for external use, it has very little use in dentistry except as a bleaching agent and as a test for putrescence in root canal work.

Phenol, U. S. P.—Phenol is a disinfectant; it destroys micro-organisms, it is a caustic, and has marked analgesic value. Because of these properties it has a wide range of use in dentistry. Phenol coagulates the albumin. This prevents its deep penetration into the tissues. Its prolonged application even in dilute solutions may cause gangrene of the parts, due to over stimulation resulting in death of the cells. In sealing phenol in root canals care should be taken to prevent its reaching apical space. While it is of value in preventing decomposition of any organic matter that may remain, undoubtedly the action of phenol paralyzes the phagocytic action of the leukocytes and practically stops the reparatory action of the tissues. Applied in hypersensitive dentin, good results will frequently be obtained. In dento alveolar abscesses its use as a stimulating cauterant for sinuses has been very successful. For painful canker sores it has been found to give great relief. Applied full strength on the denuded spot it will arrest the septic condition and the coagulum thus formed protects the exposed nerve endings. As a cauterant its uses are many fold.

Cresol, U. S. P.—This is an official drug composed of a mixture of ortha, meta and para, the three isomeric cresols. It is a colorless or straw-colored liquid, turning on exposure to light to a dark brown. It should be purchased in small original bottles, kept in the dark and diluted in small quantities. It is of great value in combination with formaldehyde in the treatment of putrescent root canals. Cresol is three times as active as phenol and four times less poisonous.

Liquor Formaldehyde, U. S. P.—Formaldehyde in combination with cresol has proven a specific in the treatment of putrescent pulps. Formaldehyde is intensely irritating. Undoubtedly much of the harm attributed to this remedy has been due to its careless use. None of the writers who have attacked it have offered an acceptable substitute. A few simple precautions will prevent many of these troubles which are placed at the door of formaldehyde. At the first sitting do not clean the canals; remove the decay at the gingival margins that a tight joint may be had. Do not place it in the canals, but in the pulp chamber. Lastly, and most important, seal with cement to avoid a pumping action upon biting.

Cupri Sulphas, U. S. P. (Copper Sulphate)—Copper sulphate, or as it is commonly known, blue vitrol, is a caustic and emetic. In dilute solutions it is an antiseptic and astringent. Light application of solid crystals produces a stimulating effect on sluggish cells. It destroys the lower forms of life even in very weak solutions. Because of these properties I would especially recommend this to you in acute attacks of pyorrhea. I have found it to be almost a specific in recent attacks of this disease. After instrumentation and thorough irrigation with salt solution, it has been applied in powder form every second day. Frequently only one application was necessary. In older and chronic cases results have not been nearly so satisfactory. Slight discoloration of the necks of the teeth may result from over use.

Zinc Chloridum, U. S. P.—Zinc chlorid is extremely caustic and very deliquescent. A ten per cent. solution may be applied to arrest hemorrhage after pulp removal. In sensitive conditions at the necks of teeth and those due to rubbing clasps or partial dentures, a fifty per cent. solution applied to the dried isolated tooth will be found to materially alleviate the sensitiveness. The practice of prescribing zinc chlorid mouth washes is to be condemned. Cook has shown that zinc chlorid prevents ptyaline digestion for several hours. Healthy tissues do not need astringents. The whole oral cavity need not be astringed in order to reach a small part of it. Apparently it is prescribed frequently because some preparations of it have a fine color and a pleasant taste. Zinc chlorid has been recommended to check the flow of serum in the so-called weeping root canals. In cavity preparation zinc chlorid gives excellent results where hypersensitive dentin is encountered. Louis Jack says: "Zinc chlorid when not contraindicated by proximity to the pulp is the most efficient of topical remedies for hypersensitive dentin." The tooth must be isolated with a rubber dam to prevent an ingress of moisture and because of the extreme caustic action of zinc chlorid. As HCl is liberated which will irritate, it cannot be used in deep cavities.

Calcii Chlorid, U. S. P.—Calcium chlorid, when internally administered has the power to increase the coagulability of the blood; dose, 3-10 grains. In suspected cases of hemophilia or where persistent bleeding has followed extraction, this prescription has been found to materially assist.

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Calcium chlorid	ʒiiss
Fld. ext. ergot	ʒiss
Syr. simplex	
Aqua qs	℥ii

M—A teaspoonful in water after meals.

Calcium chlorid is irritating to the stomach and should be well diluted. Because of the oxytocic action of the ergot this cannot be used during pregnancy. A one per cent. solution has been recommended by W. T. Silvestri for intravenous injection.

Argenti Nitras, U. S. P.—In solid form it is a hemostatic. It is the most powerful astringent and caustic of all metallic salts that can be safely applied. It forms distinctive coagulum. Szabo, experimenting in the mouth and afterward extracting the teeth, showed that silver nitrate did not penetrate diseased dentin in excess of one-fiftieth of an inch. On sound dentin even less and enamel not at all. It is useful in permanently checking caries and as a prophylactic in deciduous teeth. It will also be found useful in dry sockets and for the destruction of hypertrophic gum tissue and other growths. It has been praised by some operators in the treatment of pyorrhea in ten per cent. solution. Doctor Black states that the tooth should be exposed to sunlight for ten minutes or sufficient time for the carious surface to turn black, as those surfaces that are not turned black do not resist decay. A crystal melted on a wire will be found very convenient for application to the gingival margins of proximal cavities and other inaccessible places. This custom of many operators is to be commended. The application to the denuded roots, particularly the lingual root of upper molars, frequently avoids the necessity of devitalization. A concentrated solution made by dropping a crystal in a drop of water will be found another ready method. Dry the surface, protect the surrounding parts with a napkin and apply with an orangewood stick. A solution of salt should always be at hand in case of accident.

Emetin—Emetin is an alkaloid of ipecacuanha, discovered by Pelletier in 1867. It is an amorphous white powder. It forms crystalline salts with the acids. The hydrochlorid being very readily soluble, is generally used. The attention of the dental profession has been lately attracted to the drug as a cure of pyorrhea. The discovery of Endamœba Buccalis by

Barrett and Smith, and also by Johns and Bass, suggested the use of emetin, which Vedder and Rogers had found to be extremely valuable in the cure of amebic dysentery. Bass and Johns have found endamœba in eighty-five out of eighty-seven cases examined. They have had good results using the drug hypodermatically. Barrett reported the use of emetin in seventy-three cases, all of which, except one, has been cured. In twenty-three cases re-examined, twenty-two have shown no recurrence. Barrett has used emetin by injecting into the pockets. The results obtained by emetin seem to indicate pathogenic importance of this protozoa. Successful inoculation of pure cultures has not as yet been reported by any of the investigators. It has also been suggested that emetin may be found to be fatal to some of the different bacteria commonly found in pyorrhea pockets. Emetin can be found on the market in ampules containing one-third grain in eight minims. When used in pockets it should be diluted to make one-half per cent. solution as strong solutions are irritating to the gum.

Euclid and Fifty-fifth St.

DISCUSSION

Dr. W. G. Johnson: The essayist says that adrenalin is of doubtful value as a hemostatic in dental practice and that the maximum dose should not exceed 5 drops in 1:1000 solution. The impression should not be given from this that you could not use more than this amount on a packing to stop a hemorrhage, but that not more than five drops of 1:1000 solution should be injected at one time.

The essayist quotes the definition in the early part of his paper of "Empiric Therapeutics," which is the application of remedies based solely on clinic experience without regard to this physiologic action.

Buckley's Desensitizing Paste has not been in the hands of any of us long enough to warrant anything more than to know that we do get the desired results with its use, and that if the practice of Empiric Therapeutics (that's a good word to use often) is permissible at all, it certainly is in this case.

The essayist refers to using phenol for painful canker sores; I have found that crystals of resorcin is as near being a specific in these painful conditions as you could wish for. A wisp of cotton twisted around an instrument and moistened only enough to pick up a crystal of resorcin and that applied directly to ulcer will cause soreness to immediately disappear and healthy granulations form without a recurrence of pain.

But I have often questioned the unit we go by when we figure the irritating property of formaldehyde gas, and wondered if not too much credit is given it when used as a disinfectant in rooms containing the germs of contagious diseases.

I should like to mention at this point that I believe most practitioners either of medicine or dentistry of any great length of practice, would be glad to have the word "almost" a preface of numerous specifics that have been discovered so they would read *almost a specific.*

The strong point brought out here and one that all practitioners should assist in correcting is the too free use of hydrogen dioxid by the laity.

Formaldehyde is one of the most widely known and widely used disinfectants. The essayist agrees with others that the combination of formaldehyde with cresol in the form of Buckley's Formocresol is a proven specific in the treatment of putrescent pulps. Get that? "Proven specific." I am going to admit, right out in meeting, that I am the fellow who proved this, because you must have an exception to prove the rule, and if my memory fails me not, I think I remember opening up a tooth that I had sealed as per instructions, with cement, hard cement; I don't know but what the remedy made it harder, because it came out awfully hard.

Formaldehyde is widely used as a surface disinfectant.

The essayist gives us the good points of copper sulphate. He also covers nicely the dental use of zinc chloride.

I should like to hear in the general discussion considerable brought out regarding the last drug mentioned by the essayist—emetine. When you find some of the public asking the editors of the "Keep Well Column" of the newspapers about emetine, it is time to find out a little more of this alkaloid of a drug known since 1867.

DR. FRANK ACKER: I heartily agree with the essayist's opening remarks. There is still untouched a wide field for research in the use of drugs in our specialty, dentistry. The suggestion of a committee similar to that of the American Medical Association, to pass upon new drugs is a valuable one. There is, however, one other tendency as regards new remedies of which I wish to speak. This is not a criticism of the essayist for taking up some remedies that may be included in this category, and it is true of many remedies now used in general medicine. The tendency referred to and the criticism intended is the placing of a nearly prohibitive price, or in our specialty where the quantities used are small, if not prohibitive, at least an unjust and exorbitant price upon remedies.

If we pay one dollar for five cents' worth of an antiseptic agent that lasts us a year, we don't feel it very much, but the principle is wrong, and no man wants to be robbed. We still have many effective remedies that come from the old-fashioned ethical days when a professional man gave freely to his brethren the things he found of value.

Now I desire to take up a few of the drugs the essayist has presented and give just a word of what my personal experience in their use has been. Ethyl chlorid has proven a good general anesthetic for short operations, but as a local anesthetic in its use as a refrigerant spray, I have found it inefficient and its application painful, especially on inflamed gums where an abscess was to be lanced. I would further disagree with the essayist and say that inhaling during the use of such spray and the light anesthesia thereby produced is a benefit rather than something to be guarded against.

In the use of cocain hydrochlorid where a definite solution freshly prepared is used and in quantity within ordinary safety limits, namely, not to exceed one-quarter grain, the collapse ascribed to cocain is probably (as Buckley says) as often due to shock or fear as to the drug. As regards the value of an isotonic solution, presumably the theory is that if the blood stream and the injected solution are of the same specific gravity, there would be less pressure due to osmosis through the vessel walls, and so cause less pain. But I have found the injection of the same solution causes much more pain in one individual than in another. Neither have I been able to correlate the severity of the pain with the density of the gum tissue, or the pressure required to inject. A little wait after the initial puncture and injection of the first drop, and then a steady pressure lessening slightly if pain is felt, has given the best results.

Novocain in my hands has not proven as efficient as cocain.

Adrenalin has proven too unstable for use in a practice where it is not used daily. I have tried different manufacturers' solutions and found them changed in color in a few weeks.

Hydrogen dioxid is a good primary cleansing agent, but its continued use in open wounds has seemed to me to retard healing and sockets that remained painful and open under its use would heal readily on discontinuance and flushing with a mild boric solution. For cleaning out putrescent pulp canals applied with a few shreds of cotton on a roughened broach, using care not to pump too violently and force through the apical foramen, this old remedy (H_2O_2) is more effective than irritating, strong antiseptics.

Phenol is useful in cavity sterilization, at the same time acting as an analgesic. It is one of the tried and true remedies, and modifications of phenol that cost ten times as much are better only in the imagination of the manufacturers.

Cresol without the addition of formaldehyde will act as a very efficient and penetrating antiseptic in putrescent root canals.

Zinc chlorid, full strength, used as an analgesic in sensitive cavities, must take second place to phenol or a combination of chloroform and oil of cinnamon, or oil of cloves. As an astringent in weak solutions it has proven beneficial in treating inflamed gums.

Silver nitrate is most useful in reducing sensitive cervices of molars or in positions where the black stain produced is not objectionable. In children's teeth where health, age or disposition makes other treatment infeasible, it will reduce sensation and arrest decay.

Dr. A. W. Haines: The subject of drugs is one of which the average dentist has small knowledge. The course of instruction received by him at college was neither very broad nor deep and his subsequent application of that knowledge, narrowed down to the few drugs used in every-day practice, aware that he obtained good clinical results but knowing little of the properties and physiological action of them. I plead guilty of being one of the many whom Doctor Hirsch says obtained their knowledge largely from the advertisements put out by the manufacturers of drugs. But I live in hopes that we will have a more definite source of information soon in our National Dental Research Committee.

In speaking of local anesthetics I would say that I have confined myself to the cocain preparations as I have obtained excellent results with them. I often use it for desensitizing sound teeth for grinding or removing pulps by injecting into the peridental membrane around the teeth, using for this a needle ground off to about one quarter inch in length and square on the end (not beveled as the needles are when bought). Fill the syringe, then press this blunt needle up tight against the bone at its junction with the root, then exert pressure on the piston as in the high pressure anesthesia. If there is leakage press the needle up tighter. Hold pressure on piston for from twenty to thirty seconds then repeat the operation on the opposite side of the tooth. When usually you will find that you may drill into the tooth and remove the pulp, or grind to, or do what is necessary without any pain whatever. If pain is present, repeat the injection. With long cuspids a longer time for injecting will be necessary. In molars, inject in the vicinity of each root. This method was recommended by Doctor Zincke.

I have not used Buckley's Desensitizing Paste, but have used other preparations recommended for the same purpose, with excellent results. The only trouble I have found with it is that some patients complain of severe toothache immediately following its use, and continuing for some time. I thought it might be the pressure that caused it as the manufacturer advised temporary stopping for sealing it in, but I used cotton with varnish for sealing with the same pain resulting, and have not found up to now what causes it.

I wish to commend Doctor Hirsch on his efforts in our behalf. His former occupation of druggist makes him highly qualified for this. I believe that we as dentists should try to improve our knowledge of drugs that we may benefit humanity to a greater extent.

Conservatism vs. Radicalism—A Correction

We have received from Dr. Alfred R. Starr, New York City, a communication stating that part of the article by Doctor Curtiss, published in the November Dental Summary, is an exact duplicate of a paper on "Conservatism in Dentistry" that Doctor Starr read before a New York society and that was published in *The Dental Brief*, May, 1912.

A comparison of the two papers shows that Doctor Curtiss' paper from the fifth line of text, page 873, November Summary, to the thirteenth line on page 879, is an exact copy of Doctor Starr's article and should be credited to Doctor Starr.

DENTISTRY, IN ITS PROGRESS THROUGH THE CENTURY, TO STOMATOLOGY AS A SCIENCE

BY THE LATE JAMES TRUMAN, D.D.S., LL.D., PHILADELPHIA, PA.

(*Continued from page 65, January Summary*)

THIRD PERIOD—1864 TO 1889

The third period ranges through twenty-five years of great importance to dentistry; indeed, it may be said to be the renaissance of the profession. The organization of many colleges and dental associations, local, state and national, completely obliterated all the old conservative element and isolation methods of the earlier dentists, with the result that the reaction brought with it a craze for a more extended literature. Journals were established worthy the name. The unfortunate part of this evolution, in literary productions, was that the dental public had not been trained to love scientific reading, or to attempt its writing, and the periodicals were not much sought after and the contents were not particularly instructive. It was not until the lapse of years that a different state of things existed. The research spirit was abroad and dentistry was at last founded on a scientific basis. Men began to doubt, and doubting, question the correctness of the views held by their teachers. From this were developed new ideas in all the branches of study and practice.

Arthur destroyed by one blow the whole fabric of operative dentistry that had been so laboriously built up in the earlier periods. The introduction of rubber as a base for artificial dentures sent to the scrap heap whole years of skilled and artistic work. In fact, in all directions the thinker was manifest. Was it not Emerson who said, "Beware when the great God lets loose a thinker on this planet?" and in this case he became a discouraging factor, tumbling our gods of practice into the mythology of history. That this was to the benefit of all concerned, who can deny?

The colleges deemed it necessary that they should have an association for conference and the Association of Faculties was the result, and this further increased the mental activities toward higher things. This resulted in a resolution in that body urging the production of books on the various scientific subjects and their addition from time to time to the curriculi of the schools. The result was several adequate text books that could with safety be referred to students. Books of more importance from the original scientific standpoint began to fill our private library shelves. These are so numerous that the writer is in danger of the charge of drawing invidious distinctions if he undertakes to enumerate these according to their value. To pass over the most important would be equally worthy of criticism, for while most of these productions could not be classed as evidencing careful experimenting before drawing conclusions, they, with more or less crude theories, inspired others to more perfect work.

Among these may be classed: "The Pathology of the Teeth," by Carl Wedl; translated from the German by W. E. Boardman, M.D., 1872. This was one of the most valuable of the scientific productions of the period. Many of Wedl's conclusions have been met by more recent investigations, but the influence of this book on intelligent workers in dentistry cannot be overrated.

"Caries der Zaehne," by Leber and Rottenstein, 1867, perhaps created more interest in the attempted solution of caries than any of the other publications of the time. They held to the idea that caries was the result of a fungus, leptothrix buccalis, and that this penetrated the tubuli. This was disproved by Wedl, and since by Miller, as being impossible except through the disorganization of the tissue by acids. While this is undoubtedly true, it does not follow that leptothrix is entirely inoperative, for it may have an important influence in the production of caries. The writer's observations, previously alluded to, have forced him to the conclusion that caries is the production of several factors, leptothrix being one.

The most original investigations of this period connected with the pathology of the mouth were those performed by Dr. W. D. Miller, then of Berlin, Germany. His articles attracted wide attention and universal commendation and practically settled many obscure pathological conditions, especially "Caries of the Teeth." They were first published in the *Independent Practitioner*, May and June, 1885. Dr. Miller did more than any other man to place dentistry on a solid scientific foundation and his early death left a void that never has been filled perfectly.

The most important work, having its origin on this side of the Atlantic, is certainly "The System of Dentistry, in Treatises of Various Authors," edited by Wilbur F. Litch, M.D., D.D.S.; Lea Brothers & Co., Philadelphia, 1886, in three volumes, over eleven hundred pages each. This work, for the time, covered all that was known of dentistry, the articles having all been prepared by specialists. Many of these are original, especially those relating to subjects not based on dental mechanics.

It is not within the scope of this article to draw any distinctions, or to discuss authors' statements, but it would be unjust not to mention in laudatory terms the papers of some. G. V. Black, M.D., D.D.S., Albert Brubaker, A.M., M.D., D.D.S., M. H. Cryer, M.D., D.D.S., have produced works of lasting value. The second volume has more to do with operative and prosthetic dentistry and the list of authors is too extensive to be mentioned here, but it is needless to say that the papers are of special value for reference, as they include many men of advanced thought in a growing profession.

While the writer everywhere has been averse to bringing in his own personality, while all of the changes enumerated have come under his personal observation, he still feels under obligation to call attention to one subject given prominence in this work and to the fact that the treatment of discolored teeth was made one of the main subjects for discussion at this period. He had long been satisfied that dentists were not doing their full duty in permitting discolored teeth to remain a disfigurement in many mouths. The experiments instituted developed the chlorine treatment as effectual for this purpose, when properly used. Discolored teeth are not as prominent today as at that time, owing to more advanced knowledge of pathological conditions, hence the practice of bleaching teeth has to a large degree been forgotten as one of the lost arts. This is a mistake, however, for no matter what practice be adopted, and there were several substituted for the chlorine method, no one of value should be sent to the scrap heap of history. The average graduate of dentistry today is all too imperfectly cultivated in the history of his profession and its valuable processes and these should be perpetually instilled, no matter from what source they may have proceeded.

Further notices of books of this period, many of them valuable and some containing original matter, must be omitted.

It was during this time that one of the most important developments in scientific knowledge that medicine or dentistry had ever known, was the final product of individual research through many decades. Allusion is made to bacteriology and its placement, as one of the most valuable of all the discoveries in the healing art. When Leewenhoek, the draper apprentice, essayed the grinding of lenses and discovered in 1675 curious forms never seen before, and when in 1683 he described these and other forms, picturing them so thoroughly that the bacteriologist has no difficulty in recognizing them, he started a work that has never ceased from that year to the present.

Bonnet, of France, took up this question as a naturalist, followed years after by Pasteur, the chemist, by Schwann, the great biologist of Germany, Schroeder, of the same country, Cohn, the botanist, Klebs, and many others, including medical and dental workers in this country, but all was of but little avail, and the work of the earlier investigators was permitted to rest in biological laboratories as curious pages in history, until Koch, of Germany, in 1881, was able to marshal all the knowledge previously obtained, with extended experiments of his own, and bacteriology became a science. It has taken more than three decades to revolutionize medical thought and practice in many directions. Every day's experience with this collected knowledge makes the review of the past in dentistry a painful recollection and equally so in medicine. The former can now point with some degree of pride to the changed conditions and indulge the hope that stomatology may be regarded in the not far distant future as a science, and the medical men can feel a degree of confidence, not possessed by the older men, in the treatment of all zymotic diseases.

When one thinks of Leewenhoek, with his papers presented and read before the Royal Society of the Netherlands, and the men who followed him through two hundred and six years to Koch, 1881, and the final triumph of all, the enabling of medicine to show the way to make the zone of the Panama Canal as healthy as any other part of the globe, it appeals to the thinking mind as the great romance of this period, or any other, in the world's history, for without this knowledge the Panama Canal could only have been built at untold sacrifice of life.

The regulation of teeth had been an operation that had for years interested the dental profession, but it had not assumed the proportions it reached at a later period. John Nutting Farrar began at this time and presented many articles on this subject in dental periodicals that aroused immediate attention. The regulation of teeth had been much discussed and to some extent practiced by the older dentists, but it became more a mechanical interest than anything connected with physiological laws. Dr. Farrar was a graduate not only in dentistry, but in medicine, Jefferson Medical College, Philadelphia, and he endeavored to explain that, in his opinion, "dentists were not paying proper attention to these laws in the movement of teeth." He embodied these views in three large volumes, to which he devoted fifteen years for their completion. These were heavily illustrated throughout. At a later period this extensive work of Farrar was broadened by the labors of Talbot, Angle, Jackson and many others, until today orthodontia, as it has been named, is practiced as a specialty by many of the best men in the dental profession.

While mechanical dentistry does not make a legitimate part of this paper, it is necessary here to allude to it, as it is intimately connected with the comfort, health and happiness of a class beyond a certain age, for there is a limit to dentistry as there is to medical science. The mechanical, or as it is now called, the prosthetic, has had more serious changes than the operative, but cannot be considered in full in this article.

The earlier work was at first crude and then very artistic. The porcelain teeth of the early first period were hardly worthy the name of teeth. In the course of years all this was changed. The remarkable work of Elias Wildman, M.D., D.D.S., 1837, in preparing formulæ that had far exceeded in results anything that had heretofore been used, and his almost perfect imitation of gum in porcelain, placed porcelain work beyond criticism. The product of Samuel Stockton's house and that, subsequently, of the S. S. White Co., in the manufacture of teeth, has made the mechanical side of dentistry in this country much in advance of any other.

When the plates of gold and silver, then almost exclusively used, were made on the atmospheric principle, large and covering the entire palatine arch in the upper jaw, there seemed to be nothing further wanting. The teeth in full dentures, on gold, were usually carved and fitted to each plate and backed with heavy gold. When single teeth were used these were also backed in the same way, fastened in the usual manner, and soldered. This, in the hands of an artistic mechanic, seemed to be the ultimatum of perfection in mechanical dentistry.

This, however, could not last. It was the good of one day degenerating into the bad of the next. There was nothing apparently objectionable in these plates, for the excellent reason that prosthetic dentistry knew nothing better and nothing wrong.

When rubber was introduced in plate making, it was regarded as a vile substitute and unworthy the consideration of the mechanical artist. This was, however, antedating the bacterial knowledge and what it meant in the production of disease. When dentists came to appreciate this knowledge, there was a gradual change and rubber vulcanized became the ideal plate of the future. This was not alone due to its comparative cheapness and facility in manipulation, but for other reasons, not thought of at the period of its origin. One of these was that in the gold work it was impossible to prevent the secretions of the mouth penetrating behind the backings, or under the blocks, between these and the plates; in fact, the artistic plate, so called, became a storehouse for bacteria and the final infusion of these into the entire physical organism. This was an unheard of difficulty in the older days and led, in a very short time, to the abandonment of all porcelain blocks and teeth backed as described, except in special cases.

The improvement in the manufacture of rubber, imitating, in degree, the gum, gradually brought it into universal use. At first this, for fine work, was placed on gold bases, especially for the lower jaw, on account of weight.

Very soon thereafter a general complaint was heard and made principally by medical men that dentists were creating sore mouths by the use of rubber, colored by vermillion, and this was a preparation in which mercury bore a prominent part. The sore mouth was certainly much in evidence and it became necessary to settle the question. The Pennsylvania College of Dental Surgery, in 1868, took this matter in hand and appointed Drs. Wildman, Buckingham and Truman as a committee of investigation. It soon became evident that the main portion of the work must fall upon the microscopist of the committee, and that being the writer, he spent some months in the service. It was demonstrated that free mercury was produced in the process of vulcanization, but in extremely minute microscopic globules, all imbedded in the rubber, with no possible chance of egress to the external. No mercury was present on the external surface of the plate. The question then arose, what could have caused the sore mouths? It was certainly not mercury; the answer was very simple. The dentists of the period thought it was necessary, in order to facilitate adhesion, to leave the palatine portion of the plate rough as it came from the vulcanizer, and this rough surface caused irritation, increased, as Black demonstrated, by the growth of bacteria. The remedy was found in either polishing the palatine surface, or vulcanizing over a thin coating of tin, that left it smooth and polished. Sore mouths ceased from that moment.

There was another fact proven of even more importance and that was that properly vulcanized rubber could not absorb moisture. The experiment of forcing fluid through under great pressure was not tried, although suggested. There has never been any absorption of oral fluids in properly vulcanized rubber, but in improperly vulcanized it is possible. The writer has examined large quantities of old rubber worn for a long time and never yet has he been able to discover a particle of moisture. The great pressure in vulcanization forces the rubber in close union with every portion of the teeth, thus making it the most hygienic material that can be used for artificial plates.

One of the most important changes in the curriculi of the schools occurred in this, the third period. The feeling was rapidly growing that dentistry occupied a false position. Dr. James E. Garretson made the following assertion in 1866: "That for the support of the doctorate, assumed by the dentists, the greatest change must be effected in the matters of their training and duties." This has always been true, but it would seem as though Dr. Garretson, at that time, had doubts as to the dentists having the right to confer the doctorate without building up to the medical idea. This, unfortunately, has always been the medical opinion. There seems to have been incorporated in the medical mind that the word Doctor was the special property of the medical men. It is needless to say to the readers of this essay that "doctor" means teacher, or master, and was originally given in the twelfth century to lawyers and learned men and that medicine had no use for it until the fourteenth century. If age has anything to favor its use, we as dentists, might point to the fact that one branch of our calling, the prosthetic, was quite well advanced in Rome in the fifth century before the Christian Era, at a time when not a medical doctor existed in that city.

There was an important advance made in dental teaching in 1869, when James E. Garretson, M.D., D.D.S., published his work, "A Treatise on the Diseases and Surgery of the Mouth, Jaws and Associate Parts." This was the beginning of what is now known as Oral Surgery and no dental school today of any reputation would be considered complete without a professor of this branch, and many of these have their chairs filled by men distinguished alike in surgery and dentistry. Hullihen was the first oral surgeon and, in the first period, he performed major surgical operations and became celebrated at a period antedating the introduction of anesthesia.

THE FOURTH PERIOD—1889 TO 1913

It is not necessary to dwell at great length upon this, the fourth period of a hundred years, as it practically belongs to the present, familiar to all.

In all departments of dental work there have been changes. We have seen the operative, to which so much time and thought has been given in the past, threatened with disruption by the casting of gold fillings. We have seen the methods of older writers in the preparation of cavities made to give way to the dictum, "Cut for Immunity." The warnings of histology are no longer heeded and the lessons of pathology have been measurably cast aside, that crown and bridge work may find a place in the curriculum. Books have multiplied to an extent in dentistry, unknown, it is believed, in any other profession. Most of these may be said to be of positive value. The tendency is not now to theorize, but to prove. A book, at the present period, similar to those of the past, would be allowed to accumulate dust on the publishers' shelves. This more than aught else indicates the development of the profession.

The National Association has taken steps to have a research committee and an independent journal; indeed, the last twenty-five years have been a period of ceaseless activity.

The books are too numerous to make it worth while to enumerate them as a whole. The writer cannot, however, omit again calling attention to the great work of Miller exhibited in his "Micro-organisms of the Human Mouth."[1] He had the last, and it may be the final, word on dental caries, and if the writer may be allowed to judge, Pickerill has had the last word on saliva.[2] This is one of the most important books published the past three years.

It must be said, in addition to the foregoing, that dentistry owes more than it can repay to such men as Dr. Eugene S. Talbot, of Chicago, for his wonderful book production and all of them of research value. His works on "Degeneracy," "Irregularities of the Teeth," "Developmental Pathology" and the final work of his, recently republished, on "Interstitial Gingivitis"[3] led the writer to place him in the same rank with Tomes, Leber and Rottenstein; with Magitot, Underwood, Miller and Pickerill. His last book should be in the hands of all who attempt treatment of what is known as Pyorrhea Alveolaris. The writer is not in full accord with him in all his conclusions, but that is of small moment.

The encyclopedic character of dental publications adopted by the Lea Brothers & Co., 1886, and edited by Wilbur F. Litch, M.D., D.D.S., became a popular method of imparting general and specific knowledge of dentistry by distinguished specialists and in subsequent years several editions of similar encyclopedic works were issued in the same form by the aforesaid firm, under the editorship of Edward C. Kirk, D.D.S., and Charles R. Turner, M.D., D.D.S., so that practically all the specialties of operative and prosthetic procedures are at the command of the student in practice, professional or mechanical.

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(1) The "Micro-organisms of the Human Mouth," by Willoughby D. Miller, 1890.

(2) "The Prevention of Dental Caries and Oral Sepsis," by H. P. Pickerill, M.D., Ch.B., M.D.S., (Birm.) L.D.S., (Eng.) London, 1912.

(3) "Interstitial Gingivitis and Pyorrhea Alveolaris," by Eugene S. Talbot, M.D., M.S., D.D.S., LL.D., Chicago, Ill., 1913. The Ransom & Randolph Co., Toledo, Ohio.

Space and time will not permit further allusions to books or to changes, the latter having multiplied so rapidly that the older practitioners are naturally disheartened at the impossibility of keeping in touch with the increasing movements. Dentistry is no longer the dentistry of even 1839, but is something entirely different.

The principal universities, both east, middle west and far west, have absorbed dental schools, and some of the medical schools have also seen a new light and adopted them. The student of today in universities and medical schools must take the foundation studies in medicine, with the medical students, and the curriculi of these schools has so broadened that it has become a very serious question whether dentistry can be taught, unless an extension of time be granted.

This brings up the old question ot the relation of dentistry to medicine. The question is causing much mental perturbation in dental schools. The faculties in these see the signs of the times and are greatly troubled. The people have at last been educated to appreciate dentistry as at no period in the last one hundred years. Our law makers and authorities are demanding that the great under-world shall have the help of the dental surgeon. Philanthropists have come to see a way to do good and the Forsythe Building, in Boston, is one result. Every city of importance is having a free dispensary and colleges are giving all the aid possible to conserve the health of the growing population. The writer has been simply overwhelmed at the evidence of change. It seems like another world from that of his earlier experience, when his services were more demanded for the extraction of teeth, and oral hygiene was little more than a dream except for the well-to-do.

The changes alluded to as the year 1914 rapidly progresses leads the reflecting mind to ask, What next? It seems to the writer that there can be but one answer. At a meeting of the New York Odontological Society, 1875, Dr. Garretson said, "Most decidedly am I, for one, in favor of the abolishment of the D.D.S. * * * We may be specialists, but we can never be esteemed as doctors, in the desirable fulness of the term, until we replace the D.D.S with the M.D."

This is a far cry and dates back almost to the establishment of the Baltimore College of Dental Surgery. Dr. E. B. Gardette, 1851, strongly urged the necessity of "establishing an adjunct professorship in medical schools," but notwithstanding this pressure from the inside, all being graduates of medical schools, it availed nothing; the doors of the only avenue to this learning were closed and remain closed today with a few liberal exceptions.

It is, however, very evident that this condition, while it has lived over sixty years, is growing more a burden, it may be, to both medicine and dentistry, but be that as it may with the older body, it is certainly true that there is a growing dissatisfaction in dental ranks with the position occupied by men whose education, as before stated, in the foundation studies of medicine, warrants the opinion that they are indifferently placed in the estimation of the general public.

It is very evident that both branches of the healing art need each other on special subjects. Medicine has no right to criticise dentistry as a specialty for it has encouraged the same condition in its ranks; indeed, medicine today is simply a congeries of specialties. The general practitioner heads the list, followed by the surgeon, gynecologist, oculist, aurist, etc. It is said that these men have the M.D. degree. This is granted, but does the M.D. degree qualify those holding it to practice in all other branches? Would a layman, ignorant of the new points in medical practice, think of calling on an oculist to treat a case of typhoid fever in his family? or would a person suffering from a cataract consult a general practitioner or surgeon to have the eyesight improved? Yet we are constantly meeting with cases where the layman will call on the family physician to treat a case of alveolar abscess, the treatment of which is about as far removed from his knowledge as the cataract before mentioned.

If nothing can be done to abolish the D.D.S., it is time that medicine must be made willing to consult with the educated dentist when necessary.

The present condition of dentistry is a problem no one individual can solve. The action of medicine in 1839 forced our calling into a position that will require more than the usual wisdom to extricate us, and it is but right that those who forced us into this morass should lend a helping hand to place us on dry land. That this will be done is hardly among the possibilities and it is, therefore, essential that the dental profession should make its own pathway without much regard for the opinion of others. There would be no great difficulty in accomplishing this, if the dental men were united upon a proper course of action, but unfortunately, this is not the case, and the few at work are laboring under difficulties.

Time and space will not permit the writer to enlarge upon this, or open up any plan. The D.D.S is here to remain until something better offers, but how that can be done is the real problem at issue. There are three difficulties in the way. *First*, it will require at least five years for the study of dentistry and medicine, and possibly six. This will mean a great reduction of dental classes. *Second*, the extension of the preliminary training required by medical schools will make the advancement of the undergraduate in the dental schools to the M.D. degree, under present conditions, impossible. *Third*, the number of dentists in this country, at present, is not sufficient to meet the wants of the population and from present indications, it will be many years before an overplus of dental skill will have been reached.

The writer appreciating these difficulties has proposed to make the matter elective, providing the medical schools will rescind their foolish preliminary requirements. They will find it difficult to maintain these by constantly reduced classes. Aside from this, over-education is a detriment in all practical callings. There is such a thing as mental dyspepsia, and the young man separated from college finds he cannot apply the education received, for he has lost the power of independent thought. In the language of a large employer of college men, "They must be made over." The good four-year high school is quite sufficient to enable any young man to study any one of the professions. The present writer speaks with some degree of knowledge, for it has been his experience to have had students of advanced education in college, or its equivalent, and has failed to make of them practical dentists.

The idea of elective matriculation is based on the assumption that a small proportion of said matriculants would elect to take both degrees, D.D.S. and M.D., continuing their studies after receiving the former, for over two years. If the dental schools go to four years, as they must in a short time, it may require two additional years to secure the M.D. This would bring the final graduation to the twenty-sixth year, providing the youth leaves the high school at twenty. This seems to the writer as the proper age to begin practice. Indeed, it is questionable whether any one should attempt to deal with the ills of humanity at an earlier age. If this should eventually be adopted, there would be fewer dentists, but much better ones.

Let us not omit in our journey through the past century that brilliant coterie who have passed down to the valley of forgetfulness: Varney, Webb, Kingsley, Barnum, and last but not least, that marked genius, Dr. W. G. A. Bonwill, to whom dentistry owes a debt of gratitude it may never be able to repay.

The experiences of the writer are drawing to a close. With seventy-six years of observation—for as a boy of eleven, he wandered through his father's laboratory—and with sixty-one of practice and teaching, he can congratulate those who have followed this brief history through a hundred years, that their calling has made greater progress in that space of time than any of the professions that have preceded this; but the end is not yet, for ultimate perfection may never be attained. It has been a serious effort to reach the steps that lead to the temple of Aesculapius and laborious and wearisome to the spirit, but it has been met with undaunted faith and courage, and when these steps have been finally surmounted by all, the dentists of the future can enter the temple and be consecrated to the healing of the nations.

A Correction

Erie, Pa., Jan. 14, 1916.

Dear Editor Dental Summary: Through an error, I am made to appear to be the author of "Some Reminiscences," page 72, January issue of The Dental Summary. The paper was read by Dr. M. C. Burgess. If you will kindly announce the correction through your next issue, I shall be very grateful.

Fraternally yours,

W. J. Burger,

1201 State Street. *Secy. Erie Dental Society.*

PLASTIC SURGERY OF THE FACE*

BY W. A. BRYAN, A.M., M.D., F.A.C.S. NASHVILLE, TENN.
PROFESSOR OF SURGERY VANDERBILT UNIVERSITY

THE PRINCIPLES underlying successful plastic work are so simple and so well known that it often has been occasion for wonder to me that plastic work of the face and mouth has appealed to so few, that it is in the practice so utterly disgusting to the vast majority of operators, although the whole world may be loud in its praise of the results, considered either from a cosmetic or a functional viewpoint. But, after all, the vast majority of operations are done by rote. The original operator did it thus, and thus must his pupils, his followers, do it, or do it not at all, incision for incision, inch for inch, pound for pound. And when the patient of the pupil presents variations from the patient of the teacher, as will always be the case, there is a failure, for this class of work cannot be done by rules, except the rules which underlie the whole field of plastic surgery cap-a-pie: relaxation, approximation, protection of the blood supply, capillary, arterial, venous, and asepsis, i.e., as close approximation to it as the circumstances permit—are the things that must guide the operator; and he must have sufficient imagination to know what a human face should look like before he can apply these fundamentals to some hideously deformed face with such results that somebody may yet fall in love with that face.

I shall call attention in particular to only one of these items and that only briefly, but very pointedly. Habit of the profession has led us to think always of saving the large arteries and veins to a part; and it has become so much of a habit that we no longer look for the reason for it. The truth of the matter is that the reason lies much deeper. Blood in an artery, in a vein, is absolutely worthless so long as it is in them, and they are of value only as avenues through which blood is conveyed to a destination. We save these larger vessels, very wisely; that is, sometimes we do, but we have done nothing if we do no more than this. They must carry the blood to and from the capillaries. Hence, whenever a capillary is destroyed, a part of the gross destination of the blood is gone and the healing process is crippled that much. What shall it profit a man if he save the whole arterial system and lose the capillaries? But the blood in the capillaries is utterly worthless so long as it is in them. It is simply a stream which carries freight to and from the capillaries, which are but the wharves from which the outgoing and incoming cargoes are delivered, and unless these cargoes of nutrition are delivered accurately to the individuals at that particular station, nothing can come of circulation of the blood even through capillaries; these individuals are tissue cells and if the cell is destroyed, if it is crippled unduly by crushing with forceps, by tearing, by pressure, by laceration or otherwise, or if it is crippled by undue infection, failure is as certain as destiny. This is the reason why a bull gets the same results in plastic surgery as in the traditional china shop.

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*Read before the Tennessee State Dental Society, 1915.

I am trying to say that traumatism is the most potent cause of failure in plastic and in all other kinds of surgery. Think how little, how delicate, how frail, how unprotected an exposed subcutaneous or submucous cell is; and then think how it tells the central nervous system of the sorrows it suffers. Trauma means shock, it means infection, it means sloughing, not one iota less significant because it is microscopical, it means healing any way except the right way, namely, by first intention; it means failure, it means death.

It required thirty years for the surgical profession to learn how to keep from killing peritonitis cases by doing too much. We used to eviscerate, and wash and mop, and wipe and sponge and rub, and irrigate, and it was rare indeed we let one get away alive. Now we have grown a little wiser and much more modest in our respect for the cells of the peritoneum, and we rarely lose a patient; we can well smile occasionally now; but not so formerly, for the chances were about ten to one that we would be called upon to attend the funeral within a week. A fine illustration of small things overcoming the great, of foolishness confounding wisdom. So we must not traumatize, but respect the cells; and if I should be called upon to indicate the greatest shortcoming of the surgical world today I would get my dictionary and turn to the page marked TRA at the top, run my finger down the column till I found the word "trauma," and then I would come to a point and say, this is it. Not microscopical or gross trauma; somebody would catch us at that, but innumerable infinitesimal traumata, injury to invisible cells, the kind that only God sees.

In surgery of harelip, aside from following scrupulously the principles already enumerated, there are a few absolutely essential points if one hopes to create a normal appearance in the patient. All of us, practically, taught formerly that the vermillion border of the lip should be sutured first so as to gain an even border after closure; and the only correct guide to accomplish this end is to keep the field sponged free of blood and make certain that the dividing line between mucous membrane and skin is adjusted to the corresponding line across the cleft of the lip. There is no other guide that I have found dependable at all. This is the first essential I would mention. The second is that it is just as important to correct the flattened deformity of the nose and make a nostril of proper shape and size and, what counts for more than either of these, to place the alæ nasi at the same level. I stated above that the older operators advised suture of the free margin of the lip; but it will be necessary to depart from this teaching often if justice is done the nose by closing the gap at its nasal end first. This is true because, having corrected the nostril, further dissection will make approximation of the free margin of the lip easy enough. But the reverse of this proposition is not true. At any rate, the free margin of the nose should always be closed first and the other one of these should occupy attention next; then it will be easy enough to suture intervening surfaces. The third item is of the utmost importance, for as surely as it is not followed with the most correct judgment, a defect will occur at the free margin; this item is overcorrection. It is, as I stated, a matter for good judgment, and no successful operator on the face undertakes to have the correction appear at completion of the operation as he desires it to be ultimately; it must be overdone; there is no guide as to how much it should be overdone, except the surgeon's estimate of the amount of retraction resulting from the healing process. The fourth item is at least applicable to all wounds of the face intended to heal by first intention. In ten years' time it will probably be employed in all closed, clean wounds. It is this, namely, that no dressing should ever be applied to the wound, and no removal of the scab should be attempted short of one week after operation. I have operated on nearly two hundred cleft palates and hare lips. Every hare lip that had a dressing had suppuration, often in abundance and became foul, while those that were simply swabbed with iodin and left uncovered rarely showed pus at all and then only in minimum quantity.

The second subject to which I would call your attention is the correction of defects of the face by transplanting pedunculated flaps, the pedicle being formed of skin or blood vessels and by sliding skin which has been dissected from subcutaneous tissue. There is scarcely a defect of the face that may not be improved greatly by one of the plans. I would illustrate skin sliding and pedunculated flap transplantation by a case of noma, long after the gangrenous process had healed. The first operation consisted in freeing the skin over the jaw and neck and sliding it upward as far as possible, fixing it in that position, and restoration of the angle of the mouth. The second operation consisted in placing a mucous pedunculated flap derived from the inner surface of the restored upper lip in such position as to close the opening between mouth and nose, and second, in dissecting a long tongue-like flap from the side of the face and neck and suturing it into position for closure of the remaining opening in the face, and restoration of the nostril. The gap resulting from the dissection was almost entirely closed by suture and the remainder allowed to heal as an open wound; later the pedicle was cut. One more operation will finish the case and give something of a human appearance and use of the mouth and nose that the patient never knew the meaning of.

Flaps with vascular pedicles were alluded to above. This plan was devised by my friend, Doctor Horseley, of Richmond, Va. In recent or old defects of the face, especially of the cheek, as for instance in cases of cancer, the following plan permits us to carry our operative plans much further without serious defect than we formerly could. A flap of the size desired is cut from the anterior temporal region and the anterior temporal artery with its veins is left attached to the flap and dissected out of their bed as far back as required, and the wound closed and the source of the flap skin-grafted if necessary; a new bed is made for the vessels by making an incision which leads from the point of exit of the vessels to the edge of the defect. The vessels are placed in this incision and covered by suture. The flap is sutured in position. It cannot slough because its blood supply, arterial and venous, is brought with it. Another illustration of flap transplantation can be seen in this man who lost the ala from one side of the nose. The ala was restored almost perfectly by a pedunculated skin flap from the side of the face and the defect in the face passes almost unnoticed.

The last phase of this discussion shall be brief. It consists of a description of an operation I was compelled to devise for correction of a flat nose and for elevating the nose, which at its lower extremity had the appearance of being too deeply set in the face. The nostrils were round and far apart. An elliptical section was removed from the front of the nose with its long axis vertical. The cartilages were then sutured to each other through the nostrils, thus flattening the surfaces of the nostrils, which were in contact and changing them from a round into a normal oblong shape, and at the same time raising the anterior margin of the nose. Then a traverse cut was made between the septum of the nose and the upper lip and traction on the nose upward and downward on the lip converted this transverse slit into a vertical one, in which position sutures were inserted, giving one of the most beautiful results it has been my pleasure to obtain.

Health of American Troops Abroad

In marked contrast to the fate of the French army in its conquest of Haiti, when thousands fell victim to plague and pestilence, is the experience of the United States Marine Corps in its pacification work in that war-torn little Caribbean republic. Medical officers, in reports just received by headquarters of the Marine Corps in this city, state that the health of the Marines could not be better despite the fact that they have often been called upon to march twenty miles a day over rough mountainous roads, under a blistering tropical sun, and under conditions of actual warfare.

Haiti, according to these medical officers, has had for over a hundred years the reputation of being one of the most unhealthy spots in the world, and it has been the common belief that no white man could live there when subjected to hardship and exposure. But it remained for our Marines to disprove this theory. They have had great experience in climates closely resembling that of Haiti, and have learned to take the necessary precautions so essential to the maintenance of perfect health in the tropics.

Foot troubles were few and far between, the medical officers say, and the deaths have been caused by bullets, not disease.

LOCAL ANESTHESIA IN DENTISTRY*

BY B. H. JOHNSON, D.D.S., NASHVILLE, TENN.,

"DIVINE IS THE WORK to subdue pain"—thus expressed the great Physician of Cos, Hippocrates, acknowledging his own inability to solve the greatest problem of medical art — the relief of suffering.

The elimination of pain during surgical operations is inseparably interwoven with the history of the human race. From time immemorial, it has been the aim of those interested in the care of bodily ills to relieve pain in some empirical manner.

The efforts to solve the riddle of painless operations were seemingly so very futile that even as late as 1832 Velpeau was led to express his pessimism as follows: "To escape pain in surgical operations is a chimera which we are not to look for in our time." Little did he think that he stood at the very threshold of the discovery of anesthesia, and that less than a decade later the bliss of painless operations would be an accomplished fact. And when Diffenbach, in 1847, wrote those classical words regarding the use of ether as an anesthetic: "The beautiful dream to eliminate pain has become a fact. Pain, the highest consciousness of our earthly existence, the clearest conception of the imperfections of our body, had to bow low before the powers of the human mind," and the world at large awakened to the fact that pain had been conquered.

"The discovery of anesthesia is essentially to be credited to the dental and medical professions of the United States. The names of Crawford W. Long, Horace Wells, Wm. P. G. Morton and Charles F. Jackson are inseparably connected therewith" (*Prinz.*) (A biography of these men can be found in the University Encyclopedia.)

Dr. Samuel D. Gross, of Pennsylvania, author of several works, and in 1867 president of the American Medical Association, said: "If America has contributed nothing more to the stock of human happiness than anesthetics, the world would owe her an everlasting debt of gratitude."

"From an historical viewpoint, comparatively few important factors are to be recorded prior to the introduction of cocain for the purpose of locally obtunding pain. The compression of the nerve trunks for the abolition of pain seems to be of an old and unknown origin, which was revived by Guy du Chauliac, and Ambrose Pare, and finally found a permanent place in surgery as the Esmarch Elastic Bandage. Physically reducing the temperature of a part of the body by the application of cold was instituted about the middle of the sixteenth century. It became a lost art until Dr. John Hunter, of London, again called attention to its benefits by demonstrating it upon animals, and Doctor Larray, the chief surgeon of Napoleon's army, employed it for amputating purposes (1807). Through the efforts of Sir Richardson, in 1866, it was placed upon a rational basis by the introduction of the ether spray, which is used extensively today in the form of ethyl chlorid. The various narcotics which were employed for internal purposes were also made use of as local application, mandragora, henbane, aconite, the juice of the poppy head, and many other analgesic drugs enjoyed a world-wide reputation." (*Prinz.*)

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*Read before the Tennessee State Dental Society 1915

†The author states that his paper is more of a compilation than an original production and that he has quoted extensively from the writing of others.—*Editor*

"Probably the oldest known dental prescription, which was utilized for the purpose of abolishing pain arising from an aching tooth, is recorded upon a clay tablet, which was found in Nippur. Its age may be approximately placed at 2250 B.C. The contents of this tablet refers to the "worm" theory of dental caries and the treatment of various resins, etc., and suitable incantations to banish the worms from their hiding places. This tablet may be found in the museum at Constantinople, Turkey, No. 583-I.

Recent excavations which have been made near Nippur and Babylon have brought to light valuable information regarding the practice of medicine under Hammurabi, King of Babylon.

In Egypt the suet of the crocodile, locally applied, was believed to relieve pain, and Pliny refers casually to the mystic "Lapis Memphites," the stone of Memphis, which, when rubbed upon the surface of the skin in conjunction with vinegar, was said to produce local anesthetic effects. Nepenthe, a preparation of purified opium, was much praised by the Greeks. (*Prinz' Dental Formulary.*)

Alcohol in its various forms always enjoyed a wide reputation as a pain reliever. Noah, the tenth male descendant from Adam, anesthetized himself with it, and we of the twentieth century sometimes have patients present themselves for an extraction or dental operation, fairly well anesthetized with it.

In an early Cymric manuscript said to have been compiled by Howell, the physician, who was a lineal descendant of Einion, and which was probably written about the end of the fifteenth century, among a large number of conjectures, the following prescription was found:

"How to extract a tooth without pain: Take some newts, by some called lizards, and those nasty beetles which are found in ferns in the summer time, calcine them in an iron pot and make a powder thereof; wet the forefinger of the right hand and insert it in the powder, and apply it to the tooth frequently, refraining from spitting it off, when the tooth will fall away without pain; it is proven." (*Prinz' Dental Formulary.*) I have tried most every form of anesthetic I know of, but have never tried this one yet.

The empirical search for new methods and means pressed the mysticism of the electric current into service. "Richardson's Voltaic Narcotism for a time attracted the attention of the medical profession, and Francis, in 1858, recommended the attachment of the electric current to the forceps for the painless extraction of the teeth, and as some dental depots still offer appliances of this nature for sale, it seems that this method is still in vogue in some parts of the country. A few years ago a revival of certain modifications of the above method swept over the country under the more elusive name of cataphoresis." (*Prinz.*)

"In 1853 Alexander Wood introduced a method of general medication by means of hypodermic injections. At once it was suggested to employ such drugs as morphine, or tincture of opium, for the purpose of producing local anesthesia. The results were not encouraging, however, until in 1884, Koller advocated cocain. With the introduction of this drug into therapeutics, local anesthesia achieved results which were beyond expectations, and its final adoption created a new era in local anesthesia." (*Prinz.*)

The term "anesthesia," which was suggested by Oliver Wendell Holmes to Doctor Morton, is usually defined as an artificial deprivation of all sense or sensation, while the mere absence of pain is referred to as analgesia. Anesthesia may be artificially produced by inhibiting the sensory nerve fibers at their central end organs in the brain, or at their peripheral end organs in the tissues, thus producing general and local anesthesia. Local anesthesia may be obtained in two definite ways: We may inhibit the function of the peripheral nerves in a circumscribed area of tissue. We refer to this process as terminal anesthesia; while, if we block the conductivity of a sensory nerve trunk somewhere between the brain and the periphery, we speak of this as conductive anesthesia." (*Prinz.*)

"The sensory nerve tracts are extremely susceptible to anesthesia by perineurial injection, if their minute terminal branches are inundated with an anesthetic solution; conductive anesthesia, on the other hand, is more difficult, ensues more slowly, and requires a larger quantity and a higher concentration of anesthetic solution, the farther away from the terminal distribution of the nerves, or the nearer to the spinal column an injection is made." (*Braun.*)

This contention is fully borne out by practical experience with anesthesia for dental operations. The nerve terminals of the periosteum and of the pericementum are anesthetized in the most direct and expedient way, often from two to five minutes, by mucous anesthesia.

Anesthesia by injection at the maxillary tuberosity requires about eight to ten minutes, while the mandibular injection requires a longer period, fifteen to twenty minutes, because the large inferior dental nerve must be reached and permeated by the anesthetic. For dental operations (as will be shown by Doctor Wittenberg) injections may be made for conductive anesthesia and its modified forms at the mandibular foramen and mental foramen, for the inferior maxillary and the maxillary tuberosity, posterior palatine foramen, anterior palatine foramen and infraorbital foramen for the superior.

The superior maxillæ being more canaliculated than the lower, makes it possible to get good results with mucous anesthesia in most instances but in cases of acute abscess, or inflammation of gum tissue, or pyorrhea pockets, conductive anesthesia should be resorted to. The superior dental nerves are branches of the infraorbital. The posterior superior dental nerves arise from the trunk of the infraorbital nerve just as it is about to enter the infraorbital canal and passes down on the maxillary tuberosity, while the middle and anterior superior dental nerves are given off in the infraorbital canal in the floor of the orbit and enter special canals in the anterior wall of the antrum; hence we meet all superior dental nerves united in the trunk of the infraorbital nerve. The road to this spot is simple; in the posterior upper corner of the vestibule of the mouth, laterally of the upper molars, we palpate the inferior border of the maxillary tuberosity above which, at a distance of from two to two and one-half centimeters, the desired point is reached.

The maxillary tuberosity is behind the zygomatic process and above the root apices of the upper molars numerous foramina are found, through which the stout nerve branches, the posterior superior dental nerves, enter the maxilla, after having run a short distance with the main trunk, the infraorbital nerve, on the bony surface of the tuberosity. These nerves or branches supply the three molars with sensory filaments, and must therefore be blocked in order to obtain anesthesia of these teeth.

To make the tuberosity injection, we find the prominent border of the zygomatic process with the index finger, use a long needle and introduce it high up in the reflection of the mucous membrane at an acute angle to the bony surface and somewhat away from the bone, with the beveled side of the point toward the bone. The needle is then advanced with a slight backward and upward inclination, holding the syringe away from the maxillæ, but keeping the needle as close as possible. As soon as the needle enters the mucosa, about 1 c.c. is slowly discharged; at the same time advance the needle for about 42 millimeters and discharge the other c.c. of the solution. Mucous anesthesia on the buccal will not be necessary.

For the palate, an injection is made at the posterior palatine foramen, which is usually located one-half centimeter from the posterior border of the alveolar process and above the last erupted molar. The needle is inserted into the depression in the mucosa at about the level of the palatal root apex of the second molar, the syringe being almost parallel to the alveolus and the molar root, and inclined slightly backward toward the tuberosity. The needle is then advanced into the foramen and not more than ten drops injected; about six minutes is all that is necessary. If too much is injected it will diffuse into the loose tissues of the soft palate, causing disagreeable difficulties in deglutition. The palatal portion of the alveolus in the molar region on the side of the injection is completely anesthetized.

The infraorbital foramen is found .5 c.m. below the lower border of the orbit and almost exactly above the first bicuspid; therefore, we insert the needle in the reflection of the mucous membrane, slightly posterior to the root apex of the cuspid tooth, close to the lip muscles, somewhat away from the maxilla, advance oblique upwards and backwards; the long needle can be felt by compressing the cheek. Inject 1 c.c. or less of the solution, then massage tissues.

The infraorbital injection is a modified form of conductive anesthesia, and not conductive anesthesia proper, since the solution is intended to exert its effect in the fundus of the canal.

In most cases where anesthesia of the anterior teeth is desired, an injection above the root apex of the cuspid gives good results; the needle is inserted at the root apex of the cuspid, then advanced high up into the canine fossa, and 1 c.c. or less is deposited. (The above technic is after the Fischer method.)

The mandibular injection is considered by the writer to be by far the most important of all on account of the compactness of the bone and the consequent difficulties in getting anesthesia by any other method than conductive. We have more occasions to use this injection than any other, for in this advanced age of civilization, people do not have time to masticate properly, and food is being prepared so as to require very little mastication; hence the jaws fail to develop as large as they should and the consequence is impacted wisdom teeth, which are often very difficult to remove under any circumstances, and even very painful under mucous anesthesia, as it is impossible in most cases to get complete enough anesthesia by mucous injections to alleviate the shock and pain produced by the amount of force necessary to remove these impacted teeth; and as for all injections for conductive anesthesia, a knowledge of the anatomy of the bone is very essential. As Doctor Wittenberg is to give us a thorough drill on this, I will merely advise you to get all he gives, if you expect to practice this form of anesthesia.

As there are no two mandibles alike, we have to carefully examine each one to ascertain the point of injection. A good guide is to allow the syringe to lie across the contact of cuspid and bicuspid of opposite side, feel with finger for the ramus and its position, insert the needle near enough to bone and high enough to miss the internal pterygoid muscle, if we palpate the ascending ramus, find long bony groove and keep flat side of the needle close to lingual surface. Insert needle about 1 c.m. above the level of the masticating surfaces of molars. Do not allow the needle to bore into periosteum. The solution should be deposited slowly as needle is inserted to anesthetize the lingual nerve, which descends in front of the inferior dental or mandibular nerve; the greater portion of the solution is to be discharged in the pterygoid mandibular space. The soft tissue in this region readily absorbs the anesthetic. The artery and muscles are protected by the lungula, so there is little danger, if any, of injury to them.

About 1½ to 2 c.c. of solution is deposited. It takes from ten to twenty minutes to get complete anesthesia.

If for operation on anterior teeth, it is necessary to deposit a few drops of solution at the mental foramen on opposite side, on account of the anastomosis of the nerves. For the posterior teeth, a mucous injection should be made buccally to the second molar, to block off the buccinator nerve. (*Fischer's method.*)

The advantages of local anesthesia over general are many. I will not attempt to bring out all of them. We would not attempt to use general anesthesia for extirpation of pulps, except for extreme cases, and for extraction under general anesthesia, there is always a possibility of a tooth or fragment getting in the trachea with fatal result, and as the muscles are relaxed, it is easier to dislocate the mandible. The anesthetic plus the operation is more depressing than a painless operation with conductive or any successful form of local anesthesia, especially the extraction of lower impacted third molars. It is claimed by Dr. Theo. Blum and other authorities on this subject that conductive anesthesia eliminates to a great extent the shock of the operation, as well as the pain, and I have found it so in my practice. I had one patient who could hardly turn over in the bed, and his physician believed his condition was largely caused by his diseased teeth, and extraction of all of them was indicated. He said the patient had next to no resistance power left, and suggested that we only extract a few of them at a time and make several sittings. Conductive anesthesia was used in both upper and lower, and all the teeth were extracted the first visit and did not seem to depress the patient at all. I am sure that in this case the conductive anesthesia alleviated the shock and will in most cases, except where the shock is mostly or wholly psychological.

One great advantage with conductive anesthesia is when extracting all the teeth for plates, the long duration of the anesthetic permits the painless trimming of the process; then local anesthesia is less dangerous, especially when the proper drug is used. Local is less unpleasant for the patient and also the operator.

There are many drugs and preparations suggested and used for local anesthesia, cocain being the main one until recently, and as it has served us so long and faithfully, it seems a pity to cast it aside; but with our present knowledge of the requirements of a proper solution for local anesthesia, cocain has been outclassed by novocain. Tropa-cocain hydrochlorid has been used. Same is very expensive and its anesthetizing power less than cocain. Other substitutes are eucain—can be boiled, but mixed with adrenalin, partially destroys the vaso-constrictor power of the adrenalin. Injections are irritating. Holocain hydrochlorid may be boiled, but is irritating. Acoine hydrochlorid: more toxic than cocain and irritating to tissues. Chloretine may be boiled, but its anesthetizing power is not so great as cocain. Orthoform—not used hypodermically. Nirvanin—injections painful, less toxic than cocain; also less powerful. Anesthetine and subcutine—injections painful. Stovaine may be boiled; less powerful than cocain, partially destroys action of adrenalin. Alypine is very much praised by some; it may be boiled, less toxic than cocain, has about the same anesthetizing power, may cause gangrene, is irritating to tissues and detrimental to adrenalin. Newcidine cannot be used hypodermically; is irritating. There are many others, but will not mention them here.

Braun gives the following principles for selecting an anesthetic:

First, it must be less toxic than cocain.

Second, it must not cause any tissue lesions.

Third, it must be soluble in water and its solution must be sterilizable.

Fourth, it must allow of combination with suprarenal preparation. Must be an isotonic solution.

Novocain fulfills these requirements better than any other agent yet discovered. It was discovered by Einhorn in 1905; has the same action on the peripheral sensory nerves as cocain, and is from seven to ten times less toxic. It is equal in its potency to any of the known local anesthetics, even one-quarter per cent. solution will anesthetize large nerves; however, two per cent. solution is advocated by Fischer, Reithmuller, Braun, Blum and others.

The effects of novocain are very pleasing, even if a twenty per cent. solution is used, or the pure powder be introduced into a fresh wound; not only no untoward symptoms whatever are observed, but the local inflammation will be reduced. The toxic effect of novocain is relatively light; affects respiration first. In very large doses, tonicoclonic spasms will occur, together with opisthotonos. It is not a habit-forming drug; this fact gives a great advantage over cocain and many of its substitutes. Such men as Braun, Hainecke, Læwen, Fischer and Reithmuller and Blum claim that it is the only known agent fit to take the place of cocain in surgery and warmly recommend it for use in medical practice.

As there is no medical agent of any consequence that is fool proof, so with novocain or any other anesthetic, it behooves us to use it in a form that gives us the best results with the least danger to patients.

Fresh solution of suprarenin-novocain is absolutely essential, especially for conductive anesthesia, even the slightest discoloration indicates decomposition of the suprarenin and renders unsafe the sequelæ.

The Hœchst Farbuerhe Company put out porcelain graduates, or cups, holding 3 and 10 c.c. respectively, with metal holders in which the solution may be boiled. The Ringers Tablets dissolved in distilled water, one tablet to 10 c.c. of water, makes a proper salt solution, then one novocain suprarenin tablet to 1 c.c. of the Ringers Solution makes a two per cent. solution of the anesthetic and as it dissolves more readily by boiling and also makes the solution absolutely sterile and fresh, it only remains to have the instruments clean and sterile and the field of operation or injection sterilized and with a proper knowledge of the anatomy and ordinary care and some skill to get good results with ordinary local anesthesia and better with conductive anesthesia. (*Fischer, Reithmuller.*)

We should supply ourselves with proper instruments and equipment to keep them in proper sterile condition. The syringe should be so constructed that it can be boiled, which means no washers other than metal. The Fischer's or the New Imperial Novocain Syringe are of this type. I prefer the platinum point, because it can be made absolutely sterile by heating it in alcohol flame. The point should be long, so if it should break, it would be easily removed, as they break at the hub; then the long needle is necessary for conductive anesthesia, to reach the desired points. If steel needle is used, a new one should be used for each case. The syringe and porcelain cup should be kept in a seventy per cent. solution of alcohol and glycerine. Doctor Reithmuller devised a glass jar with ground cover, containing a metal stand to hold the instruments. I am using a candy jar with a top which fits outside and have rubber to make tight fit to keep out dust and prevent evaporation of alcohol. It would be impossible, or at least impracticable, to cover this subject thoroughly with one paper. I suggest that everyone interested secure a Fischer-Reithmuller textbook and become familiar with its contents, then proceed carefully and conscientiously, and be like a scout—"Always prepared for every emergency."

We cannot help but meet success, which will mean a blessing to the public, and enable us to do our work better, and with less pain and more satisfaction to both our patients and ourselves.

To improve the environment is to check reproduction, being indeed the one and only fundamental way in which undue reproduction can be checked. That may be said to be an aspect of the opposition between Genesis and Individuation, on which Herbert Spencer insisted, for by improving the environment we necessarily improve the individual who is rooted in that environment. It is not, we must remember, a matter of conscious and voluntary action. That is clearly manifest by the fact that it occurs even among the most primitive micro-organisms; when placed under unfavorable conditions as to food and environment they tend to pass into a reproductive phase and by sporulation or otherwise begin to produce new individuals rapidly. It is the same in Man. Improve the environment and reproduction is checked. That is, as Professor Benjamin Moore has said, "The simple biological reply to good economic conditions." It is only among the poor, the ignorant and the wretched that reproduction flourishes. Those who desire a high birth-rate are desiring, whether they know it or not, the increase of poverty, ignorance and wretchedness.—*Havelock Ellis in Physical Culture*

EDITORIAL

An Important Message

We desire to call the attention of our readers to a matter of great importance, and to ask their aid.

The European war, with its present methods of inflicting injuries, especially about the head and face, has brought forcibly before the world the need of a trained army dental corps. The Canadian Dental Corps, which went with the first troops, shows England's recognition of this fact. In the Canadian Army Dental Corps they have the rank of corporal, sergeant, second lieutenant, first lieutenant, captain, major, lieutenant and colonel.

France and Germany have splendidly organized army dental corps. The German corps has 800 dental surgeons in the service, bearing ranks about the same as the Canadian dental corps. Recent press reports indicate that France contemplates giving her army one thousand extra dental surgeons. And the great United States has consented to give its army dental surgeons *no rank higher than first lieutenant.* With this recognition given the dental corps in other countries it is all the more surprising that, in formulating bills for national defense, Congress has absolutely ignored the dental profession as exemplified by our army dental corps. And not only the dental corps in the regular army who are most affected, but dental surgeons in the state militia.

According to our present laws, a dentist joining the army dental corps, passes a thorough physical, mental and technical examination and serves three years as an acting (contract) dental surgeon. Then, if his three years' service has been satisfactory, he passes another examination and is commissioned as a *First Lieutenant*, and there he stops. He is not eligible for any higher rank.

The same laws apply to the state militia and volunteers, and *would apply to a Continental Army or any reserve force organized for national defense.*

In the army medical corps, a candidate is, immediately after passing the examination, appointed a First Lieutenant, serves three years and is promoted to Captain, and from that to Major, Lieutenant Colonel and Colonel, according to seniority. That is, his promotion is dependent upon the promotions, deaths, resignations and retirements (disability and age) of those ahead of him in rank.

A dental surgeon ranks below every other first lieutenant of the army of whatever branch, and any officer receiving his promotion to a first lieutenancy automatically jumps all dental surgeon first lieutenants, irrespective of the length of service of either, and can rank the dental surgeon out of quarters. For example, a first lieutenant dental surgeon having twenty years' service can be ranked out of quarters by a medical man who has just been appointed to the service; and still worse, any medical reserve corps man whom the war department might order on temporary duty for only a few weeks, could oust the dental surgeon from his quarters.

Aside from the injustice of such a law as now exists, it is open to grave criticism as regards efficiency. After a dentist is commissioned as a first lieutenant, there is no way in which he can be made to keep up with the progress of his professional work, as he takes no further examinations. If the army dental corps had more ranks, the inefficient and careless men could be removed when the candidates took their examinations for higher grades. It would also be an incentive to secure the services of some of the best men in the profession.

In the bills that have just been published for the contemplated reorganization of the army, the claims of the dental profession have again been ignored, but veterinarians have been given rank up to major. They provide for a largely increased medical corps, for chaplains, officers of the Porto Rico regiment and Philippine Scouts.

This places all other professions and vocations above dentistry, which is one of the most important. Why should this be so?

The medical profession is recognizing dentistry today as it never has before, for it sees that the work of the dentist means so much for the betterment of physical conditions of the people, and that physicians and dentists should be co-workers for the benefit of mankind.

They recognize that diseased teeth and other pathological oral conditions may cause systemic diseases such as muscle and joint rheumatism, stomach, bowel, liver, kidney, lung, nerve and other affections.

So, attention to the teeth of soldiers means much more than the average man realizes.

Our Congressmen are well informed men and should appreciate the relative position that dentistry holds and if they do they should accord it better recognition than they have already given it. Dentistry should be recognized as on a par with other professions. Conditions in the army dental corps should be changed, not only for the credit of the profession itself, but for the large number of civilian dentists who would have to serve under these conditions if called upon to serve in any reserve force.

Every American dentist can assist in securing desired standing for the dental profession, by writing a personal letter to his senator and representative in Congress, urging them to request the chairman of the Senate and House Military Committees to give proper recognition to the dental profession before their final draft of the Army Reorganization bill is placed before Congress.

If you do not know your senator or representative, solicit the aid of the chairman of your State and Congressional District Committee of the political party which they represent and have them wire or write the senator and representative urging this action.

Please take the responsibility of doing your part, dear reader, that we may all work together for better recognition. If you desire further information regarding proposed legislation, etc., write to any member of the National Dental Association Committee on Dental Legislation, as follows: Drs. H. C. Brown, Ch., 185 E. State street, Columbus, Ohio; C. B. Gifford, Secy., Norfolk, Va.; A. O. Ross, Columbus, O.; H. L. Wheeler, 560 Fifth Ave., New York City; C. R. E. Koch, 31 W. Lake street, Chicago, Ill., or, to Dr. John D. Millikin, Pres. of Associated Military Dental Surgeons, 323 Geary street, San Francisco, Cal.

"Tell it to the Marines!"

Listen! If you "tell it to the Marines," be quite sure you have it right, for that warring amphibian is not the credulous personage you have always supposed him to be. United States Marine Corps officers have traced the famous saying, "Tell it to the Marines," to none other than our old friend Samuel Pepys, of the Diary renown, the original "first nighter," who tells us that the saying had origin with Charles II., the merry monarch of England.

It so befell, the story goes, that his light-hearted Majesty, with an exceedingly bored expression on his swarthy face, was walking in the shade with the ingenious Mr. Pepys, secretary to the Admiralty.

"I had speech yesterday at Deptford," said Mr. Pepys. "with the captain of the 'Defyance,' who hath but lately returned from the Indies, and who told me the two most wonderful things that ever I think I did hear in my life." Among the stories told were of fish flying in the air.

"Fish flying in the air!" exclaimed his Majesty. "Ha, ha, a quaint conceit, which 'twere too good to spoil wi' keeping. What sir," (he turned, beckoned to the colonel, Sir William Killigrew, of the newly raised maritime regiment on foot, who was following, in close conversation, with the Duke of York) "we would discourse with you on a matter touching your element. What say you, Colonel, to a man who swears he hath seen fishes fly in the air"?

"I should say, sire," returned the sea soldier, simply, "that the man hath sailed in Southern seas. For when your Majesty's business carried me hither of late, I did frequently observe more flying fish in one hour than the hairs of my head in number."

Old Rowley glanced narrowly at the colonel's frank, weather-beaten face. Then, with a laugh, he turned to the secretary and said, "Mr. Pepys, from the very nature of their calling, no class of our subjects can have so wide a knowledge of seas and lands as the officers and men of our loyal maritime regiment. Henceforth, whenever we cast doubt upon a tale that lacketh likelihood, we will tell it to the Marines—if they believe it, it is safe to say it is true."

SOCIETY·ANNOUNCEMENTS

An Invitation

The National Dental Association and all ethical dentists will be heartily welcomed by the profession, the business men and the citizens of Louisville at the twentieth annual convention of this organization, to be held in our city four days, commencing Tuesday, July 25, 1916.

The First Regiment Armory, in whose 54,000 square feet of floor space the exhibition will be held, the public school building, in whose thirteen commodious rooms the clinics will be held, Keith's and Macauley's Theatres, the auditoriums of the Seelbach and Watterson Hotels, where sectional meetings will be held, are within a radius of 100 yards, and with the approval of President Hinman, the most convenient arrangements ever provided have been made for the forthcoming dental convention.

The Kentucky Dental Association will hold its annual meeting to close Monday, July 24. The National Association of Dental Examiners will hold its convention, arranging to close Monday, July 24. The three Greek letter dental fraternities will hold their annual conventions Monday, July 24th.

Louisville is the ideal convention city of America, convenient of access from all points of the country, abundant in its hotel accommodations and affording innumerable side attractions of interest.

The local committees are planning a series of entertainments, commensurate with Kentucky's reputation for hospitality, and the ladies especially who attend the convention will be guests at innumerable social functions.

LOCAL COMMITTEE

W. T. Farrar, Ch., 519 Starks Bldg., Louisville.

H. B. Tileston	J. W. Clark
Max M. Eble	E. A. R. Torsch
W. M. Randall	I. H. Harrington
R. F. Canine	W. E. Grant

Ed. M. Kettig

John H. Buschemeyer,	*Mayor of Louisville.*
Fred W. Keisker,	*Pres. Louisville Convention & Publicity League.*
Thos. J. Smith,	*Pres. Louisville Board of Trade.*
Richard H. Menefee,	*Pres. Louisville Commercial Club.*
W. H. Stacy,	*Pres. Kentucky State Dental Association.*

Rehwinkel Dental Society Meeting

The Rehwinkel Dental Society's Mid-Winter meeting is to be held in Chillicothe, O., in the Hotel Warner, with better essays, clinics, exhibits and good in general than any of our former meetings.

Meeting will be held Saturday, all day and evening, February 26th. In the evening we will serve *a big chicken dinner to all who attend.* It is requested of all who are going to attend to come early, for the exhibitors will be open early in the morning of the day of the meeting. The program is as follows:

ESSAYISTS

Dr. Hugh MacMillan, Cincinnati. Dr. E. E. Hall, Columbus.

CLINICIANS

Dr. Geo. F. Hershey, Columbus
Dr. Harry M. Semans, Columbus.
Dr. A. F. Emminger, Columbus.
Dr. Douglas Haight, Coshocton.
Dr. L. E. Custer, Dayton.
Dr. Howard Williamson, Portsmouth.
Dr. John D. Hodge, Middleport
Dr. J. O. Hawkins, Wellston.
Dr. H. E. Jenkins, Ironton.
Dr. H. G. Butcher, Urbana.
Dr. C. I. Keely, Hamilton.

A very cordial and welcome invitation is extended to all members of the state and component societies. Come!

Wm. G. Hamm,
Chairman Publicity Committee.

Dental Exhibit at Chicago

April 4-5-6-7, the Auditorium Hotel, Chicago, promises to be the scene of one of the greatest exhibits of dental manufacturers, including equipment, furniture, materials and instruments, ever shown in this country.

The exhibit committee will endeavor to make this exhibit an exceptional one and the things dental to be displayed and demonstrated in the practical way will be of particular interest to all members of the dental profession, who are cordially invited to attend.

Suitable accommodations at the Auditorium Hotel at reasonable rates, reserved for visitors, are among the many details arranged for the comfort and convenience of visitors, who are expected from all points of the compass.

American Society of Orthodontists

The American Society of Orthodontists will hold its annual meeting in Pittsburgh, July 20, 21 and 22, 1916. The usual high standard of the meetings of this society will be maintained. All those interested in orthodontia are welcome. Any communications regarding the meeting may be addressed to Dr. F. M. Casto, 520 Rose Bldg., Cleveland, Ohio.

Department of Dentistry, College of Jersey City, Recognized

At a meeting of the Board of Education of the state of New Jersey, held in Trenton on January 8, 1916, the newly organized Department of Dentistry of the College of Jersey City was officially recognized and the degree of D.D.S. (Doctor of Dental Surgery) was approved. The college was also highly complimented upon its good work and splendid progress.

The main college building is located at 96-100 Summit Ave., corner Clifton Place, and the dental infirmary is situated at 264 Warren street, corner Montgomery street, where patients are treated during the morning hours.

Besides the Dental Department, the College of Jersey City has also a Department of Pharmacy, which is recognized by the Regents of the University of New York.

It is needless to state that prominent men of the medical, dental and pharmaceutical professions are connected with this institution, which has made remarkable progress since its foundation in 1908.

Michigan State Dental Society

The sixtieth annual meeting of the Michigan State Dental Society will be held in Detroit, April 13, 14 and 15, 1916. Dr. F. B. Moorehead, of Chicago, a short-paper series and an ex-presidents' day, will feature the program. The meeting will be the largest and best in the history of the society.

Write Dr. Wm. H. Elliott, 1539 Jefferson Ave. E., Detroit, for space reservation. Dr. O. W. White, 406 Fine Arts Bldg., Detroit, will mail programs to non-members upon request.

C. G. Bates, *Secy.*,
Durand, Mich.

Northern Ohio Dental Assn.

The annual session of the Northern Ohio Dental Association will be held in Cleveland, June 1, 2 and 3, 1916.

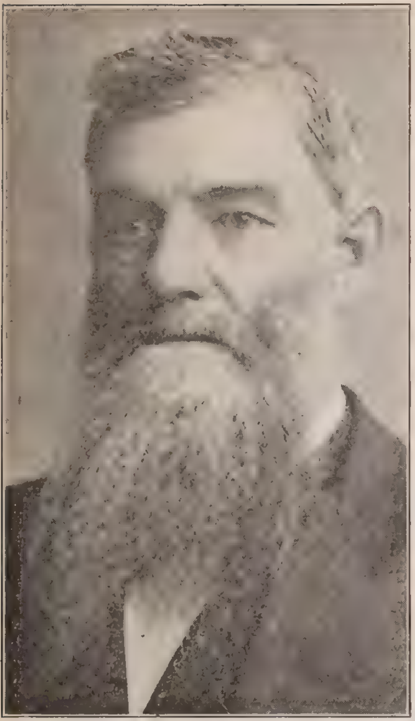
Clarence D. Peck, *Secy.*,
Sandusky, Ohio.

Connecticut State Dental Association

The Fifty-second Annual Convention of the Connecticut State Dental Association will be held at the Hotel Griswold, New London, Conn., June 13-14-15, 1916.

Papers and clinics of unusual interest have been secured, which with the excellent accommodations offered by The Griswold, will make this the most attractive meeting in the history of this association.

Elwyn R. Byrant, *Secretary*,
New Haven. Conn.



DR. CHESTER H. HARROUN, last surviving Charter member of the Ohio State Dental Society, died at Toledo, Ohio, January 8, 1916, aged 86 years.

Dr. Harroun was born at Corfu, Genessee County, N. Y., July 17, 1829, and came to Toledo, with his parents, Mr. and Mrs. David Harroun, in 1835, and settled on a farm at Sylvania. There were but two houses at that time in what is now the city of Toledo.

When still a young man he taught school and studied medicine. Not being of a rugged constitution at that time, he was advised to take up dentistry, which he did, making it his lifework, in which he was intensely interested and very successful. He soon became authority on many dental subjects, and for several years lectured at the Cincinnati College of Dentistry. In 1856, the college presented him an honorary diploma in Latin, for his services. He began practice in Toledo in 1852 and retired only 3 years ago, being continuously engaged in practice for 60 years.

He was a charter member of the Ohio State Dental Society, and its president for one term. He also was a member of the American Dental Association of the Toledo Dental Society, and an honorary member of the Delta Sigma Delta Fraternity.

It is a rather singular coincidence that Dr. Henry Hilbert Harrison, the only other surviving charter member of the Ohio State Dental Society, should have died only a month earlier, his obituary appearing in THE SUMMARY for January. Drs. Harroun and Harrison were close personal friends throughout their professional careers.

Dr. Harroun always took an active interest in the professional and social life of his city, being one of the charter members of the Middle Bass Club. Dr. Harroun was among the early members of the old First Congregational Church, and was instrumental in bringing to Toledo Dr. Williams, pastor of that church, who came here in 1853. On September 20, 1854, Dr. Harroun married Miss Emily J. Caldwell, who died in August, 1913. Of this marriage two sons survive, D. A. and R. E. Harroun. Drs. E. M. Cook, D. A. Allen, W. H. Tenney, L. T. Canfield, A. W. Jamieson and Mr. F. G. Crandell, President of The Ransom and Randolph Co., acted as pallbearers.

Dr. Claude L. Miller

Dr. Claude L. Miller died at Lamar, Colorado, of tuberculosis, December 8, 1915. Doctor Miller was born at Loudonville, Ohio, graduated from the dental department, Ohio Medical University, 1904, and practiced in Columbus, Ohio, corner Long and Ninth streets, until October, 1909, when, on account of health, he went to New Mexico, and later to Colorado, where he practiced until his death. Doctor Miller's wife and children survive. Interment at Lamar.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

If you are having unusual success along any line, write your experiences for THE DENTAL SUMMARY. Any necessary illustrations will be made without cost to you.

If you have not renewed your subscription to THE DENTAL SUMMARY and other journals, better do so at once. If any numbers are missed you may be unable to secure them later.

Items of news always are welcome to this department. Never mind how poorly you think you can write; just give us the facts.

Thirty dentists were required to inspect the teeth of children in the eighty ward schools of Kansas City. Children of indigent parents have work done free.

Dr. W. I. Nash has bought the practice of the late Dr. Gordon Gix, of Grand Rapids. Doctor Nash and Doctor Gix were schoolmates at Ann Arbor.

Mayor Bosse, of Evansville, Ind., has named these five men to be supervisors of the municipal clinic. J. O. Zubrod, chairman; V. H. Knapp, A. T. Funkhouser, R. J. Morris and A. J. Kimm. Looks like a splendid selection.

Dentists are coming into their own in cases of fracture and even extreme laceration and loss of jaw. They are producing results over in France that astonish even the most capable surgeons. The time seems about here that the entire face will be turned over to the men who know most about it, and whose operative technic is necessarily superior.

Antagonistic agitation to the toothbrush has brought out the fact that that useful instrument has no rival at the present time. Experts declare that it does an infinite amount of good, and can possibly do but little harm. See Dr. Hugh MacMillan's little article concerning its sterilization in this issue, and instruct your patients accordingly.

Dr. W. M. James, Chicago, appointed dentist to Wabash hospital at Decatur, Ill.

Platinum reached its highest record price in December, $4.15 per dwt. Has declined sharply since, on receipt of large shipment from Russia.

Duluth, Minn., dentists insist upon complete dental inspection of schools at least twice each year.

Claimed that twelve hundred dentists attended last O. S. D. S. convention—and that's a record.

It is rather doubtful that any dentist can afford to do his own laboratory work. In these days of skillful specialists, mechanical dentistry is becoming distinctly a trade, at which those so constantly employed are usre to excel.

All accepted dental colleges are to inaugurate the four-year course by 1917.

Indianapolis ethical dentists are considering co-operative advertising. Good thing. Matter should be agitated in other societies. Nothing unethical in advertising a profession.

Dental clinics began in the schools of Kalamazoo, Mich., the week of January 5.

Just to see if this department is read: If dentists who smoke will send me a quarter, coin or stamps, I will send in return a trial bottle of Breathlets, a powder to be used after smoking, that will deodorize the breath thoroughly and leave a splendid taste in the mouth. Enough for a year for a dollar. Made by a dentist. G. E. H.

An additional corps of dentists numbering a thousand is to be added to the army of the Allies, to rank as non-commissioned officers, and wear special uniform.

Convention of the National is to be held in Louisville this year. The chief city of the Old Blue Grass will know how to make everybody welcome. If you are ignorant of southern hospitality, here's your opportunity. Attendance at last Ohio State was twelve hundred; let's make this one twelve thousand.

Had the grippe? Well, be thankful that it wasn't pneumonia.

Since last issue this office has helped four dentists prepare lectures for oral hygiene work, of one kind and another, and is ready to render like service to others. We know you're busy, that writing is not your job, while it is ours, and you're welcome to anything we can do for you. And you needn't use the stuff we send if you prefer not to do so; no offense at all.

Dental societies will be doing themselves a good turn by securing Dr. H. M. Semans for a talk on conductive anesthesia. His manner of presentation leaves nothing to be desired.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVI MARCH, 1916 No. 3

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The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

THE PLACE OF THE SILICATES IN DENTISTRY.*

BY CHARLES C. VOELKER, D.D.S., (UNIV. PA.), BROOKLYN, N.Y.

IT IS NOW TEN YEARS since the first successful silicate cement was introduced to the dental profession of America; and the ever-widening sphere of usefulness which this material is finding for the esthetic restoration of tooth substance, warrants us in giving it more earnest study than it has heretofore received from either the scientific or the clinical aspect. Little research work has been done on the silicates in this country, and we are compelled to turn to the excellent work of European investigators like Prof. Steenbock, W. and D. Asch, Fraenkel, Greve, Kulka, Proell, Richter, Andresen and many others, for unbiased scientific studies on the subject.

The present communication aims to present a concrete picture of the present state of our knowledge of the silicates, together with a modicum of original investigation carried on by the present writer during the past year, with the hope that it will serve to throw further light on this most interesting field for the researcher and help to do away with the pessimistic impression held by some observers that many dentists are using this class of materials from the standpoint of empiricism and without any real knowledge of their composition and physical characteristics.

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*Read before the Ohio State Dental Society, Columbus, Ohio, December, 1915.

CEMENTS IN GENERAL.

The term cement is applied in the arts to adhesive substances used to unite masses of solid matters, large or small, into compact bodies. Since such a definition would embrace a large number of substances possessing few common characteristics except the property of adhesiveness, custom and usage have restricted the term cement by qualifying it with technical and commercial designations to distinguish between the various classes of cements.

This is exemplified in the calcareous cements of commerce, which are materials rich in calcium carbonate and aluminum silicate, obtained from calcareous and argillaceous rocks, and which are used to produce Portland cements, natural cements, slag cements, grappiers, pozzolanic and gypsum cements. These have been used in building and engineering constructions and in mosaic work, etc., from the earliest historical times. The writings of the ancients Vitruvius and Pliny, of the mediaeval authors Bartholomew Anglicus and St. Augustine, and of modern investigators like Vicat, Fuchs, Winkler, Le Chatelier, Michaëlis and others, attest the widespread use of these hydraulic cements in the building of remarkable engineering works. In some of the ancient monuments, the cement is still so hard and has resisted the action of moisture so thoroughly as to lead to the assumption that the Egyptians, Greeks and Romans possessed a secret which has been lost. But if the chemical composition of these old cements and mortars be compared with the descriptions of the methods of making them given by the writers mentioned, we find that their good qualities are the result of the thorough burning, fine grinding and careful mixing of the ingredients. It may be interesting to note that the Romans were also acquainted with the use of reinforced concrete and with water-proofing processes by means of surface-coating of cements with oils and other organic substances, and that the early writers also dealt with the theory of the setting of cements.

CLASSES OF DENTAL CEMENTS.

In dentistry, the name cement is given to a number of different substances formed from the admixture of a powder with a liquid, and used for diverse purposes. They include:

First: The pulp-capping or protective cements, such as the oxysulphates, Iodoformagen, Fletcher's Artificial Dentine, etc., valueless unless protected from the fluids of the mouth by a covering of more insoluble material.

Second: The inlay cements, especially prepared for the setting of inlays, crowns and bridges. These are of the oxyphosphate type and may also be used for filling.

Third: The true filling cements, which are distinguished as:

(a) the oxychlorids, now little used except for root fillings.

(b) the oxyphosphates, the most widely used of all the various classes of dental cements. These are further distinguished as slow-or quick-setting, hydraulic or non-hydraulic, and as copper, zinc or non-sodium cements. They are essentially mixtures of phosphates of zinc and other metals with oxid of zinc, no true chemical compounds known as oxyphosphates expressible by means of formulae being recognized in chemical terminology.

(c) and lastly, we have the so-called silicate cements, also sometimes called siliceous cements, these terms being used to distinguish them in their chemical and physical makeup from the older types.

HISTORICAL DATA.

The highly-efficient dental cements of the present time have been gradually evolved through the efforts of a host of investigators since the first osteo-plastic was introduced about 1850 in the form of an oxychlorid. Following this came the first oxyphosphates, made by mixing zinc oxid with glacial (or meta-)phosphoric acid, usually containing a modifier of sodium metaphosphate or pyrophosphoric acid. As more perfect cements were demanded by the profession, the development of a more dependable liquid in the form of the orthophosphoric acid; often modified with metallic or alkaline phosphates, was brought about; while the zinc oxid often had admixed with it such substances as magnesium and tin oxids, silica, alumina, etc., with the object of rendering them more durable.

With the improvements in the lasting qualities of the oxyphosphates as cement for inlays, crowns and bridges, and as temporary filling materials, a demand for a filling cement having greater translucency and more durability when exposed to the saliva, became insistent, and has resulted in the development of the silicate cements, whose basal ingredients are transparent and translucent in contradistinction to the opaque components of the earlier types.

The first silicate cement was offered to the profession about 1878 by T. Fletcher, but it did not live up to his expectations and soon disappeared. After an interval of about seventeen years, another silicate appeared under the name of Dentos. It soon followed its predecessor into obscurity. Then came, in 1897, Dr. Telschow's New Cement, in which the powder was claimed to be a silicated aluminium mixed with zinc oxid, and the liquid phosphoric acid to which was added a little hydrofluoric acid just before using. Although nothing more was heard of this preparation, the formula was evidently a good one, since an American silicate cement now on the market, of which I have seen an analysis, seems to contain practically the same ingredients. Following this came, in 1902, the celebrated Archite, the mention of which will doubtless conjure up before the minds of many of my hearers phantasms of varied degrees of intensity, depending upon the extent to which each had placed his faith in its loudly-sung praises. Shrinkage, dissolution, discoloration, and the excessive heat developed during setting, soon caused it to be discarded.

Since that time, many silicates have come and gone. I have a list of over twenty-five, most of which, after having lived their little hour or two, have sunk into oblivion because they could not fulfill the extravagant claims of their promoters. Those that survive, having stood the test of time as shown by clinical histories extending back from five to ten years, may be used with confidence where they are indicated and provided that their limitations are fully understood by both the dentist and his patient.

COMPOSITION OF THE SILICATES.

It is not my intention to make dogmatic statements at this time regarding the exact constitution of the silicate cements. I can but present a summary of the most trustworthy data that have been established as the result of investigations by numerous researchers, thus indicating the present state of our knowledge and suggesting the line along which future studies of the subject may be carried on.

If you were to ask me what is the exact chemical composition, whether ultimate or proximate, of the powders and liquids of the silicate cements now in use, I should be unable to answer the question satisfactorily from a strictly scientific point of view. As has been pointed out by others, as well as your essayist on a former occasion, the all-important secret of the proximate composition of the silicate cement powders and liquids is closely guarded by those whose commercial interests are dependent upon such secrecy. To such an extent is this true that in some instances these materials are not even patented through fear that the nature of their ingredients may become common property.

We need a closer relationship between the expert cement manufacturers and their technical chemists and the profession which uses these products and knows their good and bad qualities from clinical observations extending over a period of years. We also need methods for the testing and standardizing of materials and processes by competent researchers under the patronage and with the encouragement and the laboratory facilities of our colleges, universities and research foundations, as is done in European countries, especially in Germany. This would soon give us a body of exact, unbiased, scientific knowledge which would help to place American dentistry as a science in the same proud position it is universally acknowledged to have attained as an art, foremost in its achievements.

It is the opinion of expert cement chemists that the production of an ideal plastic filling material requires a knowledge of the chemical constitution and a clear understanding of the reactions which occur during the hardening process in cements. Yet the difficulties confronting the investigator of dental cements are many and may be exemplified by those that have baffled chemists in the study of Portland cement. The methods formulated for testing the latter for such important ingredients as free lime and the more complex compounds like the silicates and aluminates, have been found inexact because of the complex reactions resulting between the test solutions used and certain of the constituents of the cement. The microscope will often reveal the mechanical arrangement of the constituents; but on account of the known property possessed by silicates and aluminates of forming what are called solid solutions when subjected to the heat used in burning, it will not give us definite knowledge of the chemical composition. Hence, cement chemists are restricted to the estimation of the elements composing a cement (the ultimate analysis), and must distinguish by means of the microscope and the study of physical properties the manner in which the components are combined. The same problems face the worker on silicate cements. The impossibility of determining by chemical analysis the original products from which the silicate powders are synthetized and the proportions in which they are combined, practically forces every investigator to begin from the beginning and entails an amount of preliminary chemical and microscopical investigation that might make even the most intrepid worker pause.

The powders of the various silicate cements are all synthetic products, i. e., they are combinations of chemical compounds such as the oxids, silicates and aluminates of calcium, silicon, aluminium, beryllium and sodium. The liquids are more or less dilute solutions of phosphoric acid in which are dissolved varying amounts of other compounds, such as aluminium, zinc or strontium salts, hydrofluoric and silicic acids, etc. These liquids have also been described as solutions of alumino-phosphoric acid or of acid salts in the form of aluminophosphates. It is because the silicate powders are all built up synthetically that it is impossible for anyone but the manufacturers to know their proximate composition, i. e., the percentage of each compound used. Therefore, as I have pointed out before, such trade appellations as chemical porcelain, synthetic porcelain, artificial enamel, porcelain cement, or plastic porcelain, simply serve to distinguish one product of the synthesis of various chemical compounds from another and give us no clue regarding their true chemical composition.

The objection to much of the trade nomenclature of the silicate cements is that the laity may be misled by the names and by advertisements appearing in lay journals, especially if dentists do not carefully explain the difference, and imagine that they are receiving true porcelain inlays when silicate cement is used. This misleading of the public has been severely condemned in the reports and discussions of some of our foremost dental societies and it is to be hoped that it will soon disappear. You all know the nature of true porcelain in the porcelain inlay—a solid body produced by the fusion of a porcelain body composed of silicates and aluminates. A silicate mix, or cement, on the other hand, is a chemical or chemico-mechanical mixture of oxids, phosphates, aluminates and silicates, and in some cases other materials, produced by the action of a strongly acid liquid on a powder composed of basic compounds.

Please bear in mind, too, that the properties of a cement do not depend entirely upon its ultimate chemical composition. Two cements having approximately the same proportions of the same chemical elements may show widely different properties owing to the different manner in which the compounds containing those elements are combined. Research on the comparative value of the silicates as filling materials would be greatly aided by combining a knowledge of their proximate synthetic make-up with their structure as revēaled by the microscope and the polariscope, employing the methods of metallurgy and petrology.

In order, however, that you may form a fairly definite idea of the manner of preparation of the silicate powders and liquids, I shall give you briefly a translated excerpt from a certified copy of the specifications of a patent granted in Germany on October 30, 1903, to Dr. Paul Steenbock, the originator of the silicate cement now known as Ascher's New Enamel, as follows: "The precipitate obtained by adding sodium silicate to a solution of basic beryllium nitrate is allowed to remain in water a certain length of time and is then filtered, washed carefully, dried and heated to low redness. The preparation thus obtained (the empirical formula of which is $3\ BeO.\ SiO_2$) is very finely ground and is used as thus prepared, or if greater hardness is desired, it has intimately mixed with it some powdered glass or alumina.

"This powder is carefully mixed with fifty-two per cent phosphoric acid in which aluminium phosphate is dissolved nearly to the point of saturation and to which liquid a slight amount of zinc or strontium phosphate is also added.

"The reaction occurring during hardening may be interpreted as follows: The acid liquid withdraws from the basic beryllium silicate its beryllium oxid content, with the precipitation of phosphates and the hydration of the silicate."

Improvements in composition and manufacturing technic have, of course, occurred in the evolution of this material, but the above may be taken as a good illustration of the manner of preparation of a silicate cement. All the other silicate cements, so far as my observations extend, seem to be but modifications of this process, with the substitution of alumina and fluorids for the beryllium compound in the powders and the modification of the liquid in various ways. Some of the silicates show, besides, such a high percentage of alkaline salts as to make it doubtful from a chemical standpoint whether they are adapted to be used as durable filling materials.

CHEMICAL ANALYSES OF SILICATE CEMENTS.

Analyses of silicate cements published by Dr. Herman Fleck, of the Colorado School of Mines, in 1908, showed them to consist of powders containing such substances as the silicates of lime and aluminium, lithium phosphate, free lime, silica and borates, and the liquids were all found to be modified phosphoric acid solutions sometimes containing hydrofluoric acid.

An analysis of Harvardid published by a German chemist in 1913 shows:

Silica (SiO_2)	40.26
Alumina ($Al_2 O_3$)	50.62
Lime (Ca O)	5.00
Magnesia (MgO)	.51
Potassium and Sodium Oxids	1.08
	97.47

The remaining two and one-half per cent. probably is made up by hygroscopic moisture, usually present in these powders. From the above, and from the statement of a chemist who has analyzed both, I am convinced that both Ascher's New Enamel and Neues Harvardid contain only a very slight percentage of the alkaline salts (sodium and potassium compounds).

I shall also append two analyses which I have obtained of silicates now on the market and largely used, the composition being expressed in terms of the oxids, as is usual with mineralogists when dealing with silicates and other oxygen salts of complex composition.

Number 1. The powder contained:

Silicon dioxid (SiO_2)	36.91
Aluminium oxid ($Al_2 O_3$)	33.69
Phosphorous pentoxid (P_2O_5)	4.00
Calcium oxid (CaO)	7.26
Sodium oxid (Na_2O)	15.88
Water (hygroscopic)	2.26
	100.00

The liquid proved to be a modified phosphoric acid solution, containing zinc and aluminium phosphates.

Number 2. The powder contained:

Calcium oxid	2 parts
Silicon dioxid	44 "
Aluminium oxid	41 "
Sodium oxid	13 "
	100 parts

The liquid was a solution of phosphoric acid, containing about ten per cent. hydrofluo-silicic acid.

I am inclined to believe that the high percentage of alkaline oxids in these two silicates constitutes a weakness which should be eliminated. These alkaline salts are introduced to lower the heat required to fuse the mass and to aid in the fluxing of the other refractory ingredients. Perfection of the flux of these ingredients increases translucency and tends to keep the silica in them in the amorphous state, which I shall show further on is an important factor. Yet it would seem to be a mistake to attain the high degree of translucency shown by the two products under discussion at the expense of the property of durability. When mixed with the cement liquids, the alkaline salts may form soluble phosphates of the alkali metals which would leach out in time, causing the mass of the filling to become porous. Hence, I should be inclined to favor a silicate cement with a low alkaline content on analysis, even at the expense of a slight lowering of the degree of translucency, over one showing a high alkaline content and great translucency.

The consensus of opinion of those who have given the silicates detailed study, both here and abroad, leads to the conclusion that a silicate mix contains calcium and aluminium or beryllium phosphates, admixed with silicates, aluminates, fluorids and other compounds. Chemically, they are closely allied to the older oxyphosphates. Apropos of this viewpoint, permit me to quote from a communication received by me from one who is probably the foremost silicate cement authority in the world, Dr. Paul Steenbock, of Berlin. He says: "The result of the setting of the older zinc oxyphosphate cements was a solid body made up of phosphates which enveloped the free oxid particles of the powder. But zinc oxid and the oxids used together with it, such as magnesium oxid, calcium oxid and aluminium oxid, in the forms in which they were employed, were not translucent; consequently, they had either to be discarded or prepared in some other form. Of the pure oxids, those of aluminium, beryllium and magnesium were capable of being prepared in the translucent form, but they gave trouble with regard to the complete fixing of the acid. We therefore resolved to employ readily decomposable compounds of the oxids instead of the oxids themselves. These compounds had to be translucent, easily decomposable by the cement acids, and had to furnish insoluble translucent decomposition products. Of the possible compounds, such as the borates, basic phosphates, fluorids, etc., the silicates proved to be the most suitable. Instead of the simple oxids we therefore combined silicic acid compounds of the oxids with the old cement liquids; that is to say *we put up the older cements in a new form.* I was therefore not a little astonished when everybody fell to imagining that there must be some secret behind the new cements. Yet we had done nothing more than to conduct a well-known process along lines which brought about a definite physical affect. Hence, *the silicate cements must be described, as regards their chemistry, as identical with the older oxyphosphate cements*, with the sole difference that in the oxyphosphate cements the fixing of the acid takes place rather more quickly initially, and that the silicate cements require close observance of the mixing ratio. The hardened silicate cements are mixtures of phosphates, silicates and silicic acid." In the light of this plain statement of facts by Dr. Steenbock, much of the advertising and quasiscientific literature that has been disseminated regarding the silicate cement question, will need revision.

PROPERTIES ESSENTIAL IN A PERFECT CEMENT.

Having thus rapidly outlined the history and chemistry of the silicates, I should like to call your attention to certain points of practical value which must be taken into consideration when forming a criterion of the place of the silicates in dentistry and of the qualities which an ideal cement should possess. Before doing so, however, in tribute to the memory of that great dentist whose monument is to be unveiled on this anniversary occasion, I should like to recall to your minds the twelve characteristics which Dr. W. D. Miller set down as necessary to an ideal filling material. They are: Hardness; unchangeability, or chemical indestructibility; constancy of form and volume; low heat conductivity; color like natural teeth; absence of deleterious action on tissues and health; easy manipulation; minimum sensitiveness to moisture; adhesiveness; antiseptic properties; easy removal, if necessary. Applying these principles of Miller to our cement problem, we may state that:

Both the powder and the liquid, if carefully handled, should retain their original forms indefinitely. The containers should be kept well stoppered, in a dry place, and away from other chemicals and drugs.

Discoloration of the filling or of the tooth in which it is placed should not occur because of the material used. If it happens, it is usually due to faulty manipulation, to the use of metallic instruments other than tantalum, to admixture of foreign matters, or to the presence of metallic salts in the cement ingredients which form sulfids when exposed to the air or to the mouth fluids. It may also occur from the possible change wrought in the powder or the liquid if they are left exposed to the fumes of dental drugs, such as tincture of iodin, etc.

The ingredients of a silicate should be free from deleterious substances which might cause harm to the pulp of the tooth. The writer has treated this phase of the subject in detail in a former communication. Suffice it to say at this time that the silicates most prominently before the profession today will not cause irritation or death of the pulp if they are used rationally, and if the pulp be protected or removed when necessary, as is done under other kinds of fillings. Arsenic is no longer a factor to be feared in modern dental cements; while the dilution and modification of the phosphoric acid content in the liquid decreases the chances of pulp irritation to a minimum. The pulp of teeth have died and will continue to die under all classes of filling materials, as well as in teeth that have never apparently suffered the inroads of dental disease such as caries or pyorrhea. In the very few deaths of pulps under silicate fillings which have occurred in my practice during the last ten years, out of a total of some twelve hundred fillings, I have invariably found the cause to have resided largely in a lack of judgment in not removing the pulp when it was probably already infected, or in neglecting to use an impervious cavity lining in deep cavities, and in "taking a chance" that the pulp would survive. Feiler, of Germany, recommends the use of a layer of number thirty gold foil over the pulpal wall as a protective from the acidity of the silicate liquid. Another German writer reports only two deaths of pulps under a total of 1050 fillings made with the Ascher product.

Expansion and contraction should not occur in the ideal cement filling after it has set. The recurrence of decay around our fillings is probably due to the fact that a perfect and permanently water-tight filling is practically impossible of achievement with any of our present-day filling materials. As dental caries is essentially a bacterial disease, even one micron (the one-twenty-five-thousandth of an inch) of space between tooth substance and filling material will permit the ingress of the saliva and its contained bacteria. All of our cements seem to have a tendency to contract after setting. Dr. Proell, of Koenigsburg, after careful experimentation, came to the conclusion that silicate fillings, after they had once set and had become wet, should not thereafter be allowed to dry out completely but should be kept wet. There is therefore some danger of failure in cases of persons who are mouth breathers and whose anterior teeth in the upper jaw stand forward and are not kept constantly moist by the saliva.

A cement should set completely and perfectly in a short time. I shall not take up in detail the fascinating theory of the setting of cements, contenting myself with calling the attention of those interested in this phase of the subject to the colloid theory of Michaëlis and to some experiments made by me along this line. I was attracted to the study of this matter by a statement made in the course of the communication received from Dr. Steenbock, mentioned above. He states that the amorphous precipitation of the phosphates in a mix of silicate cement leads to the formation of jellies. Silicic acid, and it may be also aluminium silicate, combined with water, are precipitated in the form of jelly, which mixes with the phosphate precipitates and solidifies after the cement liquid is used up. I had found out previously that analogous conditions obtained in the setting of Portland cement. In fact, the adoption of the theory of the colloidal precipitates (the gelatinous masses called "gels") into Portland cement chemistry has made possible a clear and rational explanation of the process of setting.

It has also been shown that hardened calcareous cements, when ground into thin sections and polished, show a granular and an intergranular structure under the microscope, the latter being colloidal in nature as can be proven by immersion of such sections in dilute eosin solutions. Colloidal substances, or gels, absorb dyes, whereas crystalline substances do not. My experiments in this direction show that thin sections of silicate cements (even those which are claimed by some investigators to be impervious to the action of dyes) will also stain, and microscopic examination shows what seems to be a granular structure.

The specimens which I shall now pass around for examination are made from sections of mixes one one-hundredth of an inch in thickness of five different silicate cements now on the market, namely, Ascher's New Enamel, Ames' Berylite, DeTrey's Synthetic Porcelain, Abraham's Translucin, and New (or Neues) Harvardid. The specimens were allowed to harden for several days until completely set. Those showing the blue coloration were then placed in a dilute solution of eosin azur over night; those showing the red stain were placed in a solution of neutral red. I would also call your attention to the dense, beautiful mirror-like surface produced on these specimens, as can be observed in those left unstained, produced by pressing the silicate mixes between ordinary microscope slides. You will note how readily all the specimens took up the stain.

My study of these phenomena lead me to the conclusion that because a silicate mix will absorb a dye this does not necessarily indicate porosity of the material, as has been claimed by manufacturers when comparing the merits of their products over those of their competitors, and as appears to be the conclusion to be drawn from the work of Dr. Robert Richter, of Germany, who has given this subject of the staining of the silicates with dyes extended investigation. The staining appears to me to be rather an indication of the physical and chemical affinities of the mixed cements for the staining reagents of the laboratory. Neither does it necessarily follow that because a silicate mix will stain with dyes that it will also stain when placed in the mouth except in so far as its surface may become discolored by the same agents which discolor the natural teeth. Richter's experiments in all cases favored New Harvardid as being resistant to dyes, which he attributed to greater density and lack of porosity of this material, yet one of the specimens you have before you is New Harvardid and it also shows considerable affinity for the dyes.

A cement should not develop great heat while setting. Tests made by various investigators, including the present writer, at temperatures varying from 80 to 97 degrees Fahrenheit, showed that the temperature of setting of various silicate cements varied between 84 and 122 degrees F. Silicates showing higher setting temperatures than blood heat should be avoided on account of the danger from pulpitis when the mix is placed in deep cavities and also because of their tendency to set too rapidly, preventing correct manipulation.

Climate and temperature should not affect the setting of a cement. This is a problem which has not yet been completely solved and until it is we must follow the directions given in the literature accompanying the cement regarding the mixing temperature. I find that in hot weather the use of a large glass slab, cooled first and kept so by means of an electric fan near the chair, as well as mixing the cement slightly thinner than in cold weather, and also working rapidly, tends to overcome the tendency to too rapid setting.

Density, freedom from porosity, hardness and insolubility are essential qualities in a perfect cement. None of those at present in use are free from objections on one or more of these grounds, and we must endeavor to overcome their shortcomings by careful manipulation in mixing and insertion, and *by maintaining a perfect prophylaxis of the mouth* in order to keep it free from the organic acids which cause tooth and cement dissolution. A hardened mass of silicate cement made with extreme care and placed under great pressure while setting will always show, in thin sections under the microscope, what appear to be bubbles of greater or less depth; and when stained with dyes, some of these cements show fine cracks radiating in all directions into which the dye rapidly penetrates. I should prefer a silicate cement which kept a perfect, unbroken surface after hardening is complete, even though it had great affinity for the staining reagents, to one which resisted the dye most but showed extensive cracking of the surface. The latter would probably prove to be porous and would soon discolor and dissolve in the mouth.

Adhesiveness is a property not yet highly developed in any silicate cement. Its absence requires the undercutting of cavities as for gold or amalgam. At times the use of a layer of soft oxyphosphate cement into which the silicate is pressed is to be recommended.

Hydraulicity, or the power of a cement of hardening under water and of setting without reference to the presence of air, is a very desirable quality in dental cements. The active hydraulic ingredients, or hydraulites, of the cements of commerce are silica and alumina; and the hydraulicity of the cement depends upon the relative proportion of these ingredients and of lime. As suggested above, the modern theory of the setting of cements looks upon it as a process of hydration, or the breaking down of the hydraulites by means of water, with the formation of colloids, or gels, combined with crystalline or amorphous substances, a gradual dessication of the gelatinous mass, even under water, bringing about the hardening of the cement.

Manufacturers of silicate cements seem to doubt the hydraulic properties of their products since they often insist upon the use of a varnish as a protective covering for a certain period of time after the initial setting of the mix and before the saliva is permitted to reach the filling. Personally, I have more faith in the hydraulic properties of the silicates since I have often been compelled to allow access of the saliva within a few minutes after the initial set had taken place, and yet after a period of considerable time such fillings compare very favorably with those made under the most exacting attention to technic as prescribed by the originators.

The question of the problematical value of a varnish to coat a silicate filling after it has set has been so clearly put by Dr. Herman Fleck, an expert cement chemist, that it will well bear repetition here. He says: "In many cases the compounder includes a varnish or wax in the package and advises the use of these. Such coverings are of doubtful value, for several reasons readily understood. The alcohol acts upon phosphoric acid, thereby changing the composition of the surface material. All cements in moist condition do not take to varnish or wax. When a cement requires protection from water, it is because its liquid is super-charged or its powder constituents contain insufficient neutralizing material. Provided that a covering material is found that will adhere at all, its duration is not long. The slightest disturbance will cause leakage through it. To have a cement so prepared as to *require* moisture after a brief period, goes a long way towards constant results."

I now come to a phase of the subject which is of paramount importance in discussing the relative merits of these silicates. I refer to the property of translucency. This is the factor which is most sought after and which has been mainly instrumental in causing the silicates to replace so largely the other kinds of filling materials in anterior cavities. It has been attributed to the beryllium and aluminium compounds and also to the presence of silicates and fluorids in the mix. As I have pointed out above, it is sometimes attained to a most remarkable degree by the addition of alkaline fluxes to the refractory silicates and aluminates during fusing, with the corresponding danger of dissolution after the filling has been in place for some time, due to formation of soluble phosphates.

I am going to present for your consideration an explanation of the phenomenon of translucency which has not been given the attention it deserves by American researchers and for which I am indebted to the discoverer of many truths concerning the silicate cements, Dr. Steenbock. I refer to the amorphous nature of the phosphatic precipitates in the silicate mix, as opposed to the widely current idea that a silicate mix is entirely crystalline in nature. Steenbock claims that the phosphates, when precipitated from aqueous solutions, are highly translucent, especially in the amorphous form. It was necessary, therefore, in making up the powder of his cement, to see that the free powder particles also should be translucent. That was the whole secret of the translucent cements. The manner in which this was achieved I have already shown in the first part of this paper when discussing the composition of the silicates. It is the amorphous precipitation of the phosphates which would appear to promise the highest degree of translucency, the amorphous state being that of optical homogeneousness. Crystalline mixtures are very little translucent owing to the varied arrangement of the individual crystals and the optical differences between the crystals of the different substances. The only truly universal property of all the various kinds of glass used in the arts is that of possessing an amorphous structure, so that vitreous bodies may be regarded as typical of solids lacking definite structure. Ordinary window glass is transparent owing to its amorphous and completely vitrified structure; crystalline glass, such as French (or Reaumur's) Porcelain, a true glass, is hardly translucent because the ingredients, some of which are crystalline, are not heated to the melting point and hence are not completely vitrified. Zinc oxid forms a crystalline phosphate, magnesium phosphate gives both amorphous and crystalline phosphates, while lime, aluminium and beryllium oxid form amorphous phosphates. This will make it clear why the three latter are preferred in the preparation of the translucent cements.

I feel that it is incumbent upon me, since I too have fallen into the error of using the term in a former paper, to correct the impression that it is entirely a crystallization that takes place when a silicate mix is in process of setting. We should substitute for that phraseology the term "setting," especially if we are endeavoring to correlate the phenomena of the setting of silicate cements in dentistry with those which occur in the setting of Portland cement, which seems to be the trend of the latest scientific thought on the subject. I have examined under the microscope the powders of all the various silicates in use and there is very little evidence in any of them of crystalline substances referable to any of the various crystallographic systems. Compared with finely powdered quinin or cocain hydrochlorid or various other truly crystalline bodies, even when finely powdered, the silicate cement powders present a picture of amorphous structure under the microscope, using strong direct bull's-eye illumination, quite similar to the truly amorphous pure zinc oxid powder and to finely powdered glass. I have also ground up mixes of the silicate cements after they had set, with the same result. I have also watched very thin mixes of silicate cement made on cover glasses and subjected to magnifying powers varying between twenty-five diameters up to twenty-two hundred diameters. Long, crystalline needles occasionally showed here and there throughout the mass, but any true crystallization of the whole mix in definite crystalline forms classifiable under any of the systems known to crystallography, it was not my good fortune to find. Rather the phenomena noted during the setting process were those which have been shown to attend the setting of concrete cements, for an account of which I would refer you to any standard work on the chemistry and testing of hydraulic cements, such as that by Desch.

While on the topic of translucency, it might be well to call attention to some points of superiority possessed by silicate fillings over porcelain inlays. The essential reason for the use of porcelain over gold is an esthetic one, since probably ninety per cent. of porcelain inlays are placed in the anterior teeth. More perfect and beautiful restorations than are possible through the use of porcelain in the hands of experts could not be conceived, provided it were possible to maintain the porcelain inlay in that perfect state indefinitely. But the unconquerable bugbear of the cement line and the lack of a practicable method which will eliminate it, combined with the necessity of depending almost entirely on cement for adhesion of the inlay to the tooth, the cement being neither fine enough nor sufficiently translucent and insoluble in saliva, warrants the general statement that a porcelain inlay is only as durable as the cement which holds it in place. This has led many of us to warn our patients that after the lapse of from two to five years inlays might have to be recemented because of the dissolution of the cementing material. There are, of course, conditions where the porcelain inlay will continue to be used as extensively as heretofore. But my experience has been that the silicate cements of the present day bear favorable comparison with the porcelain inlay from an esthetic point of view; that it is as easy to replace or repair a silicate filling as it is to recement an inlay; that they seem to be about as durable as the great majority of porcelain inlays up to the time when such inlays need recementation or replacement, and that when they do wash out or need replacement for any reason, there is usually very little recurrent caries under them, probably due to the antiseptic action of the phosphoric acid or acid phosphate content of the cement mix, an observation which I feel convinced you have all made with reference to oxyphosphate fillings and cemented or cement-lined fillings.

SUMMARY OF ADVANTAGES POSSESSED BY SILICATES.

The qualities which I have enumerated as necessary to a dental cement may be considered the essential factors which constitute that most important attribute of any filling material, namely, durability. This attribute may be said to comprise the strength and permanency exhibited by the metallic filling materials, the insolubility and esthetic effect of the porcelain inlay, and the adaptability, ease of manipulation and pulp-protecting qualities of gutta-percha. The combination of these qualities into a single filling material is a problem worthy a master mind, expert in the chemical technology of cements and the clinical aspects of dental filling materials. Until this ideal is reached, let us take our patients fully into our confidence and carefully explain to them the advantages and disadvantages in the use of the various filling materials to which we are limited, including the silicates. I feel warranted, in the light of a clinical use of the silicates extending over a period of more than ten years, in telling patients that silicate fillings may be depended upon to give good service and prevent the progress and recurrence of caries, if used only where they are indicated, for periods which at present must be placed between the limits of two to eight years, since the newer silicates and the improved forms of the older ones have not been in use a longer time. I note very frequently, however, with great satisfaction, silicate fillings inserted from five to ten years ago still in excellent condition. The ease of preparation of the cavity and of insertion, the avoidance of the pain and the loss of sound tooth structure so often associated with porcelain inlays, as well as the uncertainty as to the permanency of the latter, and the greater esthetic effect of the silicate fillings over gold, combined with a much slighter strain on the purse strings, particularly appealing to those in moderate circumstances, have proven decisive factors in popularizing this class of fillings with the intelligent laity, even though such fillings cannot yet be called permanent in the loose sense in which that term is used as applied to gold and porcelain, and in spite of the fact that silicate fillings sometimes fail and have to be replaced like other fillings.

CAUSES OF FAILURE.

Many failures have resulted in the past because these cements were treated in the mixing like the older oxyphosphates and little attention was given to the kind of instruments used and to other important details. Among the causes of failure were: Omission to use the rubber dam; the use of steel, German silver, aluminium or other metallic instruments except those made of tantalum; mixing the cement too thick and too near the setting point, making correct manipulation impossible; mixing too thin and permitting a large excess of acidity, causing irritation to the dentin and pulp, slow setting of the mix and a tendency to porosity and dissolution; the use of vaseline or other oleaginous substances as lubricants on instruments used in insertion and finishing; the access of moisture before the mix had firmly set; the lack of correct cavity preparation and especially the removal of all carious dentin; dependence on the slight adhesiveness of the silicates; dessication of the tooth in drying the cavity, with consequent tendency to irritation, first from the hot-air syringe and then from the free acid or acid phosphates in the mix entering the open tubules of the dentin; the failure to protect the pulp in deep cavities with an impervious cavity lining; and lastly, but very important, the failure to institute and maintain a perfect system of prophylaxis of the mouth in order to keep fillings and teeth clean and the oral cavity free from the organic acids which cause dissolution of cements and the recurrence of caries. There were, of course, certain defects in the older silicates when first introduced which were causes of failure; but with the gradual improvement in manufacturing technic and a closer study of these materials by dentists and chemists, we may expect increasingly better results.

TECHNIC OF MANIPULATION.

The cavity is prepared with undercuts, and if the dentin is very sensitive or the cavity quite deep, it should be lined with a non-irritant and impervious cavity lining. The enamel margins should not be bevelled and should be free from traces of the lining material.

The powder and the liquid are placed in the proper proportions on a clean slab (about six inches long by three inches broad and one inch deep). Slabs may be of plain or of the so-called Carrara glass or preferably of agate. The water-bottle slab of Ames is also excellent. The proportion of powder to be used with the amount of liquid varies with the different brands of silicate cements. Hence, it is best at first to follow to the letter the directions accompanying the cement until expertness has been gained in this respect. Usually two to three times the bulk of powder is required to each drop of liquid used. The liquid is placed on the slab a short distance from the nearest mass of powder by means of a small pipette or glass rod. Two to three drops are usually sufficient for even the largest cavities where silicates are indicated. The powder may be divided for convenience into several portions on the slab.

In mixing, a properly shaped agate spatula having rounded edges should be used. Spatulas of bone or ivory and of metal tend to contaminate the mix since they will not resist the hard particles of the cement powders and the quite heavy pressure needed in the latter part of the mixing. About one-and-a-half to two times the bulk in powder in proportion to the liquid is rapidly drawn into the latter and spatulated with a rotary motion, the spatula being flat on the slab and the amount of rotation being confined within the space of less than one inch. When thoroughly spatulated, successively smaller amounts of the powder are added until the mass begins to become sticky. Before adding each new portion of powder the mass already spatulated should be scraped from the slab with a sweep of the spatula lengthwise of the slab and replaced with a rocking motion of the spatula on the slab, thus thoroughly incorporating the powder with the liquid until a homogeneous mass is obtained. The point of proper consistency is reached when the mix has a tendency to follow the spatula when it is raised from the slab, forming cone-shaped masses but remaining sticking to the slab, and when it does not settle down again into a rounded mass.

In the insertion of the filling, the main point is to work rapidly so that it will be in place before the initial set of the mix has proceeded very far. Only tantalum, tortoise-shell or other non-corrodible instruments should be used. The first portion of cement is placed into the cavity and condensed to the margins, working from the center outwardly. The middle portion is then filled in under considerable pressure and a piece of thin celluloid or glazed linen strip may be placed over the filling and even pressure applied by pulling the strip against the filling, care being taken that the strip does not buckle and that the contour of the filling be not flattened. This procedure is especially applicable to approximal fillings. By this time setting of the mix is quite well advanced, and I would caution against burnishing over the strip in order not to break up the surface of the mass. The strip should be held with the fingers firmly against the filling for about three to five minutes, which is the time for the surface hardening to take place. Then the patient should be told that it will require from ten to fifteen minutes before the filling has completely hardened so that the rubber dam can be removed. A little melted cocoa-butter may be applied after the surface of the filling has hardened, just after the strip has been removed, as it is said to prevent the evaporation of water vapor from the setting mass. About twenty minutes after completing the insertion of the filling, it should be finished with the rubber dam on, if possible, otherwise it may be coated with a varnish and the patient dismissed until the final set has taken place, which takes a number of hours. The finishing must then be done at a subsequent sitting, since it is not always possible to finish a silicate filling with the rubber dam in place. The finishing is done with strips and disks lubricated with cocoa-butter to prevent friction. When finishing at the same sitting as the insertion of the filling, this is varnished with copal-ether varnish to prevent the access of saliva for a time.

GENERAL CONCLUSIONS.

We may now briefly summarize our conclusions regarding the place of the silicates in dentistry, as follows: They have largely taken the place of gold fillings and of porcelain inlays in simple approximal, buccal, labial and lingual cavities, especially in the anterior teeth. On the occlusal surfaces of bicuspids and molars and even the incisal edges of teeth, they often may be used with good results. In cases where gutta-percha and oxyphosphate cement fillings were used formerly as more or less temporary expedients, or when inexpensive fillings were required, the silicates give better results because of greater durability and esthetic qualities and only slightly greater cost to the patient. They must, however, be employed with great circumspection in compound cavities, as the incisal corners of anterior teeth and approximo-occlusal restorations. In these cases they should be reenforced with metallic pins and oxyphosphate cement.

The avoidance of the unsightliness of gold, of oxyphosphate cement and of gutta-percha, and the compatibility with and salvation of sound tooth structure so often sacrificed in the past in the insertion of other forms of filling materials, especially inlays, have combined to place the silicates on their present high plane of usefulness. Examples from case records will serve to illustrate the force of these contentions.

A little less than a year ago a girl of twelve whose mouth had received dental attention at intervals up to within a short period before, came to me for the treatment of an abscessed tooth. Other trouble in the mouth was not suspected by the little patient's elders. All the permanent set of teeth except the third molars were in place. Examination showed thirty simple cavities and two approximo-occlusal-buccal cavities, besides the abscess, and questioning elucidated the fact that no attempt had been made to inculcate what I call the "hygienic sense" into the child's mind, although she brushed her teeth in the desultory fashion of most children who are not properly instructed in mouth hygiene. After relief from the abscess pain was secured, prophylaxis of the mouth was instituted and maintained during the whole course of treatment, soon resulting in a wonderful improvement in the oral conditions.

Twenty-one of the cavities were in the anterior teeth, upper and lower, centrals to cuspids, with one on the anterior surface of an upper bicuspid. The cavities ranged in size from one-sixteenth to three-sixteenths of an inch. This was a case in which, on account of the age and temperament of the child, as well as the beauty of the face, mouth and teeth, it would have verged on the criminal to have used gold or even porcelain. The filling of those twenty-one anterior cavities with the silicates and the insistence on perfect mouth hygiene at all times, by means of brushes, silk floss and the other requisites for that hygiene, not overlooking careful mastication, have restored that mouth to a state of perfect health; and I may add that without my chart to guide me, I was unable to locate some of the silicates I had inserted when the patient returned for examination several months later. Surely none of the other filling materials at our command could have been used with equal satisfaction and with as little nervous strain on both patient and operator.

Another case was that of a woman who came to me for treatment in December, 1908. There were twenty-seven cavities, besides other conditions requiring treatment. Of the cavities, nine were in the anterior teeth, upper and lower, and they were of such a size that porcelain inlays were indicated. For good reasons, I filled those nine cavities with Ascher's Artificial Enamel, with the understanding that as they needed replacement I would gradually substitute porcelain inlays. After the lapse of just seven years I have had to replace only one of those fillings, which was done last June, six and one-half years after it was inserted, and I replaced it with a silicate filling instead of a porcelain inlay. This patient has at the present time eleven silicate fillings in her mouth and is entirely satisfied with the way they are holding out. Of course, she follows out the details of oral hygiene prescribed by me.

I might recite many cases similar to those given where silicate fillings have preserved the teeth in which they were inserted for periods ranging from one to ten years. I have also been impressed with the excellent condition of fillings of silicate cement which have been in use on the occlusal and buccal surfaces of bicuspids and molars, some as long as ten years.

Failures? Of course I have had them. But my percentage of total failures has been comparatively small. I have kept records of all the silicate fillings which I have inserted during the last ten years, and I have been privileged to examine about eighty per cent. of them within the last four years. The result of such examination, combined with the knowledge that patients had been frankly told what clinical experience with the silicates had shown and what might be expected of them, has helped to sustain that feeling of confidence in their use which has impelled me to employ them to such a large extent where formerly I used the porcelain inlay. My clinical experience covers a total of about twelve hundred silicate fillings inserted during the past ten years.

The improvements that have been effected in the silicate cements during the last five years and the good clinical results obtained by many dentists who have employed them rationally during the past decade, warrant us in according them a prominent place in our list of dependable filling materials. We no longer have to combat with our patients as strongly as did the older generation of dentists the idea that a tooth filled once ought to last forever. Cavities may be filled as perfectly as human skill and knowledge may permit with the materials at our disposal, yet there will remain always a joint where tooth and filling come together, and no joint is as perfect as the unbroken tooth surface. We can only approximate the ideal as yet.

Before closing, let me recall to your memories a prophecy made in 1901 by that great dentist whose life was devoted to the uplifting of his profession, the late Dr. Safford G. Perry. He said, in his characteristic manner: "Before I give up the ghost I want to see something used for filling teeth that will be as permanent as gold and far more permanent than oxyphosphate. We will strike something some day that will be like the rising of the sun. These young men will not have to wear their lives out as we older men have done. As a profession we have not been studying this question of the plastics as we should have done. It will have to be studied in the laboratory and more earnestly than heretofore before we get the ideal material, but it will be found one of these days and then the incompatibility of gold will be talked of no longer nor will the appearance of gold be the shock to the community that it is today—and I want to live long enough to see it." Dr. Perry did live long enough to see his prophecy well on the way toward fulfillment. The evolution in our methods of practice brought about by the developments in preventive dentistry, in conjunction with the remarkable improvements in material and technic for the restoration of diseased and lost dental tissues, that have occurred during the last decade, has given the dental profession a new conception of the hygienic, the esthetic and the beautiful, so aptly characterized by the saying that "the highest art is that which conceals the art of the craftsman," and the silicate cements are prominent among those factors which are helping to bring about the ideal for which we are striving.

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DISCUSSION.

Dr. Geo. T. Fette, Cincinnati: Personally, I want to thank Dr. Voelker for the scientific exposition of his subject. Every available information pertaining to dental cements and the silicates was carefully brought out, and I think we all will highly appreciate a printed copy of Dr. Voelker's valuable article. You all agree with me that Dr. Voelker left little room for criticism, so that my remarks must, necessarily, be restricted to what Dr. Voelker did not say.

I think Dr. Voelker should have told us something about cavity preparation and special means of reinforcing our silicates. The greatest objection which I find in the silicates is edge strength, not so much at the free corners as at the cavity margins. If the cavity margins can be cut at right angles all around—which also, necessarily produces right angular corners to the body of the filling material—the objection becomes naught. But if we vary from this angle, chipping either of the tooth-enamel or of the silicate filling follows, according as the former or the latter forms the acute angle.

I was very glad to hear Dr. Voelker touch upon the colloid theory of cements and the silicates. I sincerely believe that our future progress in silicate work must come from a painstaking study of colloid chemistry. If phosphoric acid, for instance, is the precipitant of our silicate mix, in as far as it is an electrolyte with a high negative valency, why could not some other neutral ionic salt be employed to accomplish the same thing? We would then obviate the use of an acid. Of course, we know that phosphoric acid, of all the mineral acids, is the only one which does not coagulate albumin, but it is an acid nevertheless, and we have to contend with ionic hydrogen. I suppose the employment of phosphoric acid, by force of habit, was simply carried over from its old use in the dental cements.

Again, might it not be possible that, owing to the large number of ingredients as employed in our silicates, like the silicic oxid, aluminium oxid, magnesium oxid, calcium oxid, and the oxides of the alkalis, we have, in part at least, what is known as *reciprocal coagulation,* that is, the ingredients mutually precipitating each other, owing to oppositely charged electrical conditions. We must class our silicates under the *suspensoids,* or the irreversible colloids, in which the electrical condition is more pronounced than in the *emulsoids.*

The absence of adhesiveness in our silicates, I think, is easily explained from their colloid condition. Investigators in colloid chemistry tell us that hydrogels, or colloid jellies, extrude or squeeze out a solution which is more dilute than the general body of the liquid phase during gelatination, or in other words during the setting of the silicates. These dilute droplets coming to the surface of the entire gel must prevent adhesion. I think this extrusion of the more dilute liquid phase in the silicates is also the basal principle of hydrolicity, in which Dr. Voelker is a firm believer, in as much as the *adsorption equilibrium* while in progress of formation can not be influenced by water from without. Then, again, I think, the hydrolicity must be maintained from the fact that our silicates are suspensoids (irreversible colloids) and as such are incapable of hydration.

Dr. Voelker gave us a complete account of his tests upon the various silicates with the different dyes. I think Dr. Voelker made those tests in the dry.

Dr. Voelker: Yes.

Dr. Fette: Now colloid chemistry, which, in fact, is primarily founded upon surface energy, makes this distinction, namely, that absorption and adsorption are two different things, that absorption means occlusion as within pores, while adsorption designates condensation or adhesion upon surface. The dyeing of colloids, or of the silicates, is an adsorption phenomenon. The power of adsorption becomes less with increasing concentration, since the specific surface energy decreases with that concentration, so that the nearer we approach the point of setting of a silicate filling the less dye should be adsorbed. *I think if this adsorption equilibrium is satis-*

fied by water, as when a silicate filling is wetted, the colloids cannot dye, i.e. *the silicates cannot take up the dyes. The importance of this statement goes parallel with Dr. Voelker's claim that "silicate fillings once wetted should not be allowed to become dry."*

Another factor which I think should be investigated—and this respects the welfare of the pulp—is the physico-chemical effect colloid silicate fillings may exercise upon the pulp. We know that all colloids are semi-permeable membranes which affect the osmotic pressure. I do not wish to state that these semi-permeable membranes produce osmotic pressure. All I wish to say is that the meshes of the colloid silicates might be of such a nature as to allow ingress of injurious ions to the pulp or exit of the normal salt contents from the pulp.

Dr. C. S. Starkweather, Bellaire: Doctor Voelker has given us a very comprehensive essay on the silicates. I know we appreciate his efforts along this line. We should have more researchers and their findings should be placed in a form that we can grasp and use the knowledge they obtain for us. We, of Ohio should feel proud that the Research Institute of the National Dental Association is located among us.

They should effect economy in our purchases and save us from embarrassing failures by the statement that this or that material (naming material and manufacturer) is of little value. When a good article is found, they should direct our attention to it. The research worker will save the dentist years of groping and failure. Let us get behind them with our funds and help, demanding results and we will get them.

I do not like the essayist's paper. He writes an essay and then he turns about and discusses it. (Laughter.) There is nothing for me to do except hit a point here and there that he has omitted.

As a dentist I have no time to enter into the intricate chemical nature of cements, but as a dentist I must take the time to perfect a technic that will give good results.

The manufacturer does not make a dental cement; he prepares the elements and the dentist completes the process. It is very important that the manufacturer and the dentist be in perfect accord. General knowledge of cements is not sufficient. There must be knowledge that relates to the manipulation of the particular cement the dentist proposes to use. Logically the manufacturer should know more about his product than any one else. He must give us correct instructions; if they are thrown away unheeded, we blame the manufacturer for our failures. The manufacturer experiences trouble from the man who thinks he knows so much about cements in general that he will not observe the detail which relates to the one cement in particular.

Doctor Voelker, fails to state what particular silicate he now uses. I would infer Ascher's. Having had about ten years experience with the silicates, I have used and discarded many makes.

Ascher's I discarded several years ago chiefly because there was no standard material or technic. Just when you thought you understood it they would change the material and you would begin again with a new material that I did not like as well as the first. The DeTrey's product in my hands produced more pleasing results. I hope it will equal Aschers in durability. At present I am using DeTrey's and Translucin often side by side in the same mouth. My preference at present is for Translucin.

I know we are handling a very complex and easily spoiled material every time we mix a silicate filling. There are many factors over which the manufacturer has no control, that influence final results.

First. Chemical impurities in the atmosphere, as various forms of carbons, iron, and sulphur, that are thrown into the atmosphere by our manufacturing industries.

Second. Dust and dirt blown from the street or walls of the building, into our operating room. Odors from our medicine cabinet will in a short time affect the quality of the material.

Third. Variation in temperature and humidity from day to day of the air in our room. The altitude of different sections of the country, have an influence and affect the working quality of a silicate.

Located as I am in a manufacturing district of the Ohio valley, the air of which is seldom clear or free from smoke, dampness and fog, I find very few days that I consider good for porcelain or silicate work. I do not obtain ideal results under present conditions. Some of you have your radiographic room, but you have never told us of your porcelain or silicate room. I am looking forward to a room for this work. Here is the idea, and some of you may help develop such a room.

It should be a small, light, tightly closed room, equipped with chair, glass stand or table containing our filling materials and the few instruments they require. Over chair, table, patient and operator should be placed a white tent or enclosure to diffuse the light and catch dust. The air entering the room should be filtered, temperature and humidity should be the same at all seasons of the year. I prefer a temperature on the dry bulb of 65 degrees, wet bulb 60 degrees.

When we have prepared our cavity and are ready for the filling, conduct patient to the special room and place your filling under more perfect standard conditions. Given the best porcelain and silicates, combined with the best technic we should receive standard results. A standard working condition must be obtained before we are to have the ideal results.

Silicates will save more pulps than cohesive gold. It is the best tooth conserver we have. Let me urge you to give the smallest detail your closest attention. For that is the only way we may attain unto perfection.

I should like to ask the essayist the average time he spends upon a silicate filling.

There is much more I might say, but there are others here who must be able to give us more light. I appreciate the time and research work Doctor Voelker has put into this subject.

Dr. Voelker: (Closing). As to cavity preparation, I would suggest straight edges, and not beveled edges. Undercut your cavities, and if they are deep line them with something impervious and that will eliminate the difficulty of osmotic pressure, to a large extent.

There is nothing new about these cements. They have been put up, as Dr. Steenbock says, in a new form. Greater attention to the technic of manufacture and closer attention to the production of translucency have developed these things, but they are by no means perfect yet.

Dr. Fette's suggestion as to the development of a neutral liquid is a very good one, and the man who can discover that liquid can name his own price. We need more research work on this subject. It should be done under the auspices of authorized bodies. And while I am on this subject, I want to say it is not fair in the discussion or in the writing of a paper that the names of these various products should be specifically mentioned as regards facts derogatory to them, because most of them are patented propositions, and the man who does it as an individual is apt to get himself into hot water. He should have the backing of organizations who will uphold him and take the blame for all expressions which might lead to law-suits or other disagreeable consequences.

As to adhesiveness, I might state from my observation of the silicates, that possibly Berylite has the greatest. I haven't given it enough study to be sure of that, and would like to know more about it. I know a great many other points, points that are derogatory to every one of these silicate fillings, but I do not care to mention them specifically until they can be brought out under the auspices of a dental society that will stand back of the man who states them.

As to which cement I use, I may say I have put in about 900 fillings with the various Ascher products, and perhaps 300 with the DeTrey product, but the time for comparison has not been long enough. The DeTrey product has only been in use some four years, and I have been using it only two years, and am thus not in position to make comparisons as yet. Time must elapse before we can get data in that respect.

Success, as Dr. Starkweather brought out, depends on minute attention to the detail of manipulation. Learn the technic. The men best qualified to show you the best technic of the silicate cements, as far as the mixing goes—and much depends on that—are the men who demonstrate the various brands of silicate cement on the market. They can give you points of great value. The technic you must learn yourself. It is attention to detail, not neglecting any of the finer points you would attend to in the manipulation of any other material. This is the most delicate material that we have in dentistry, and we must use it with a good deal of respect.

As to the average time, I generally allow about a half hour per filling. If the patient comes in, and the separation has been made with the expanding orthodontia material for separating the teeth, you can prepare the cavity, put in the silicate and polish it, and cover it with varnish in about half an hour, and if there are two cavities approximating, you can sometimes put in two at one sitting.

A ONE-TOOTH BRIDGE.*

BY D. D. SMITH, D.D.S., SANDUSKY, OHIO.

THERE ARE MANY TIMES that a part of a lower molar is too badly decayed to be saved as a whole, or that one root is abscessed so that it is necessary to cut the two roots apart and extract the bad one and save the good one.

In a case of this kind I inject cocain, separate the roots with a disc and extract the bad root. Insert a pledget of cotton in the cavity where the root has just been extracted and proceed to prepare the remaining root for a crown.

The root I fit with a seamless shell. Seamless because it is easier and not as much chance of coming unsoldered.

Take a seamless shell that fits a little too tight and expand until it fits. Anneal often. Lay the shell on the side and hit it with a hammer to make it oval. Trim it down until the top is below the occlusal, giving space to fill in, or make a shell by sweating or solder as is your usual method, if you do not use the seamless shells.

It is not necessary to put a top on the band, but pack some pink wax down into it so the plaster or modeling compound will not run down too far. Pay no attention at this time to contour. When the shell fits the root perfectly at the gingival, take impression with bridge-tray, pour up, and separate.

Wax up the little shell to make it appear like a molar on the occlusal, using a little borax to make the molten gold adhere to the gold shell when casting. Or use a little Parr's Hard Wax Flux made by S. S. White Co.

At this time see that you get the proper contour.

Break the crown off the model and finish the waxing, leaving the investment in the crown.

Insert the sprue wire at a desirable point and cast, using plate gold. This can be done very satisfactorily with old crowns, bridges, etc., as the karat is higher than it would be if a cusp were swaged and then filled in with eighteen karat gold solder.

A very successful tooth can be made in this way by extending a lug from the extension and letting it rest in a slot made in a filling or inlay in the next tooth.

I wish to impress the importance of proper contour to the crown as stress is greatly governed in this way.

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*Clinic Ohio State Dental Society, Columbus, Ohio, December 1915.

ROOT RESECTION AND APICAL CANAL FILLING AFTER RESECTION.*

BY CARL D. LUCAS, D.D.S., INDIANAPOLIS, IND.

MY PURPOSE in coming before this society is to demonstrate a method or technic which should be employed in the treatment of alveolar abscesses at the ends of roots of teeth, in cases where there are pyogenic membranæ at the ends of devitalized, infected teeth, which will not respond to therapeutic treatment. I contend that it is a physical and therapeutic impossibility to eradicate that condition without surgical interference, for at least two reasons: The first and most important reason is that the apical portion of the root, which extends into the pyogenic membrane, is necrotic upon its cemental surface, and the tissue will not tolerate it, even though we could eradicate the infection. The irritation due to the etched condition of the cementum would produce a chronic irritation and keep up a sub-infection.

Second, the pyogenic membrane is enclosed in a bony crypt, the outer walls of which are necrotic. We have two necrotic areas to deal with, the periphera of the crypt and the etched necrotic cementum of the root end.

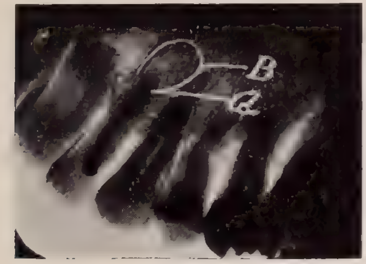

Fig. 1

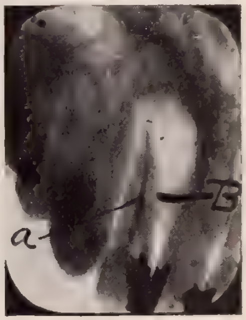

Fig. 2

This slide (Fig. 1) illustrates the condition at the end of the root of a tooth which had been treated by a good operator about twenty times without a definite result, and we had to resort to surgical interference to eliminate the subinfection produced by the infection at the root end. It looks like a small abscess, but it did not respond to treatment. There was an attempt made at filling the pulp canal, and it was filled to about this point (a). The necrotic area is outlined by this line (b), which shows the area of necrosis or rarefaction that resulted from the infection at the apical end of the pulp canal. The slides which follow were made at the time the root end was excised.

(Fig. 2, Cast II.) This slide shows the necrotic area and a broken broach in the canal at this point (a). There was something like pustulene or some other worse than worthless filling in the canal. In the operation it was necessary to cut the root down to this point, (b), which shows that there wasn't much of the root left, but it was gratifying to note that after a year had elapsed the tooth was firmly implanted in the jaw, and the tissue entirely healed. A radiograph showed that new bone had completely filled in the cavity.

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*Descriptive Clinic given at Ohio State Dental Society, Columbus, Ohio, December, 1915

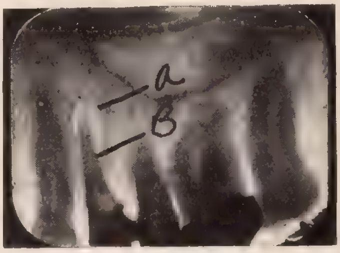


Fig. 3

(Fig. 3.) Another tooth which was treated for a long time. (a) Shows the area of necrosis and the attachment of the pyogenic membrane at B. at the junction of the healthy and necrotic surface; it was operated with a successful result.

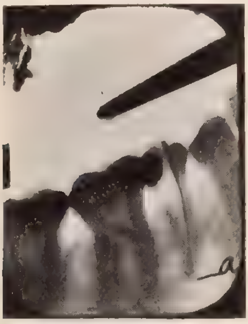


Fig. 4

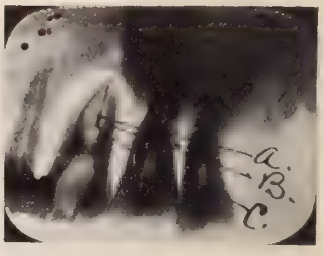


Fig. 5

(Fig. 4.) We treated this tooth twenty-one times, and though we employed all therapeutic measures at our command, we could not cure the abscess. (a) Shows an opening at the side of the root, but it was not made by a drill, but with a smooth broach and sulphuric acid demonstrating an accessory foramen. At the operation I found the root end necrotic and pitted. It would have been a physical impossibility to have preserved that tooth without leaving a focus of subinfection, except by surgical interference.

(Fig. 5.) This is a molar tooth with canals filled to apices. The radiograph indicates a perforation in the trifurcation at (a) but such is not the case. These canals were filled to the ends of the roots, although there is quite a curve in the apical third of mesio buccal root at (b). This tooth was opened into, and a round bur directed into the lingual canal to that point (c). Beyond point (c) extends the lingual pulp canal filling—not a perforation. That is one of the last pulp canals I have filled, using the Callahan method. It is probably the only pulp canal I ever did fill successfully. (Laughter.)

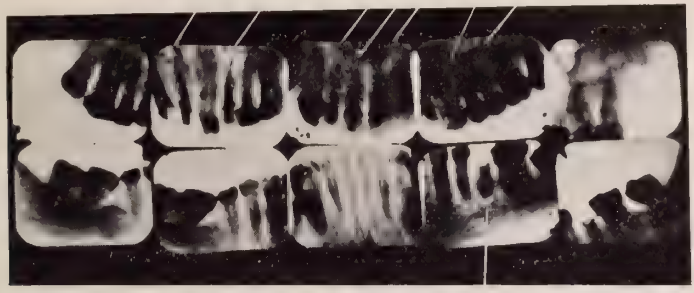


Fig. 6

(Fig. 6.) In systemic conditions, where we suspect infections of the mouth due to obscure foci of infection to be etiological factors, we follow this method of getting radiographs of all of the teeth (illustrating the set of ten films abscesses at * * * * * * *). We had quite a number of areas of infection in this case, and after those areas were operated, the systemic condition was entirely relieved.

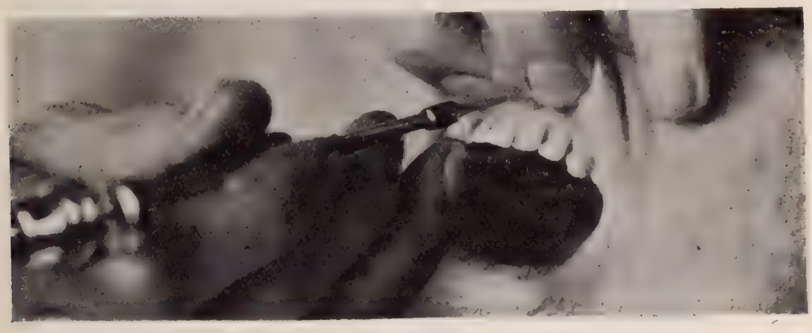


Fig. 7

(Fig. 7.) This slide illustrates the method of injection of novocain-suprarenin at the beginning of the operation. We, of course, employ the necessary technic in having our solution sterile and follow closely the rules of surgical cleanliness. Before making the injection, dry the gum thoroughly and scrub it with tincture of iodin. Insert the needle into the tissues above the apical end of the root and the area of infection. I also make an injection above the area of infection upon the lingual side of the tooth to be operated.

(Fig. 8.) Shows headgear and retractors in place for the operation upon a lateral incisor root. The incision is started above the apex, over the central incisor, carried to this point, (a), and then across to this point (b), and then carried toward the distal above the apex of the cuspid. The periosteum is dissected loose from the labial alveolar plate, and the flap raised and the retractor adjusted to hold it up. In this case the labial plate of the alveolar process was not destroyed. A large round bur was used to expose the end of the root. After I had drilled one mm. into the bony plate, the drill dropped into the pocket (c) containing the pyogenic membrane.

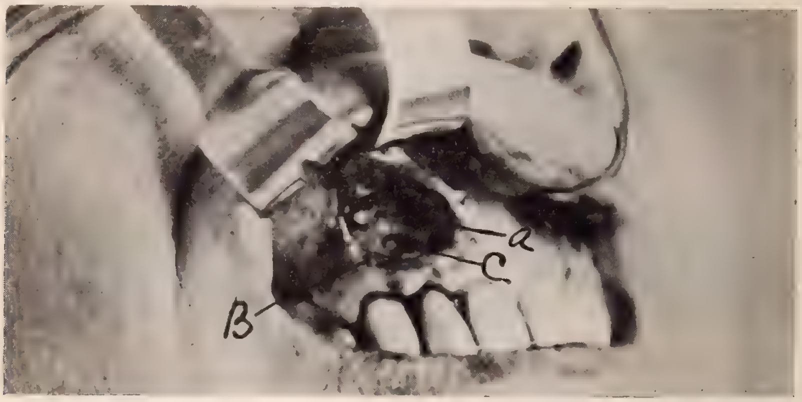


Fig. 8

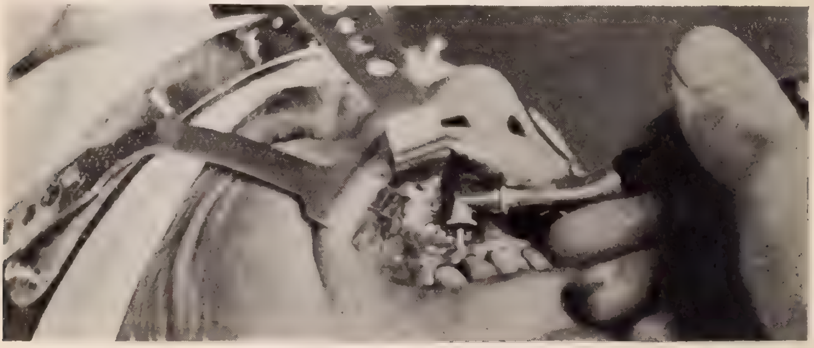


Fig. 9

(Fig. 9.) After the dissection was made through the labial plate and the pyogenic membrane curetted out, the end of the root was cut down to normal pericemental attachment, not by using a spear point drill and perforating the apical third of the root and cutting laterally as in an apicalectomy operation. I use a number nine round bur and begin drilling at the apical end of the root cutting down to the healthy pericemental attachment. In this technic, cut the root down to the point where it is attached to the alveolar process by normal, healthy pericementum and to the lamella of the healthy cementum of the root. In so doing we have gotten rid of all of the necrotic root end.

After this has been accomplished, polish the root end with cylindrical stones. With a small round bur prepare a self-retentive cavity in the remaining end of the pulp canal and fill it with amalgam, being careful not to leave any excess or particles of amalgam in the crypt.

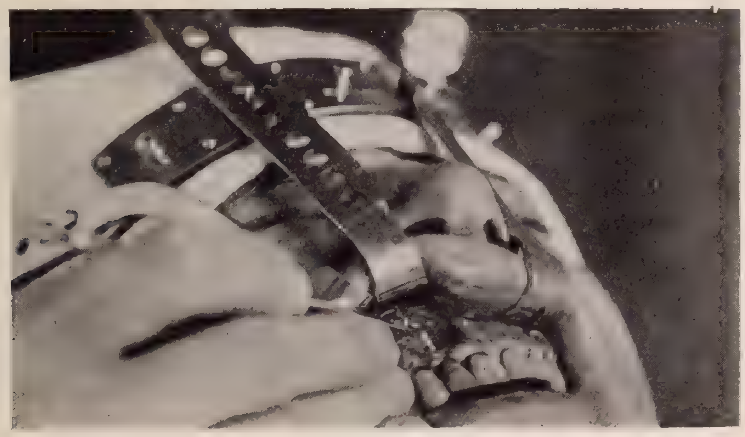


Fig. 10

(Fig. 10.) This slide shows the plugger in position in the process of filling the end of the root. I have used copper amalgam, but prefer ordinary silver amalgam. In case of operation upon lower teeth, I have the dentist who referred the case, fill the pulp canal to the apex if possible with copper amalgam, before operating, because it is practically impossible to fill the remaining end of the canal after the apical end of the root is cut off. But it is so easy to fill the remaining apical end of the canal in the upper teeth after having removed the necrotic portion that I prefer to fill the apical end instead of having it filled through the pulp chamber. If you fill the canal with copper amalgam, it will discolor the tooth and this is especially objectionable in the upper anterior teeth.

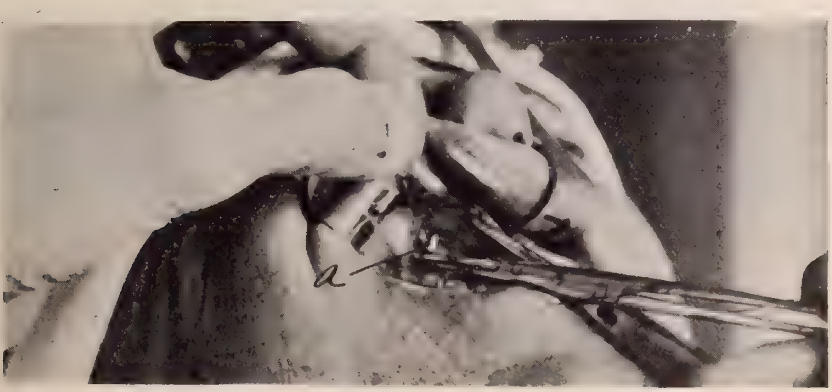


Fig. 11

(Fig. 11.) After the root end is filled, all of the pyogenic membrane curetted out of the pocket, all the necrotic bone removed and the crypt irrigated with normal saline solution, release the flap and bring it down to place and suture to original position. This slide shows the needle in place (a) where I first begin the suture.

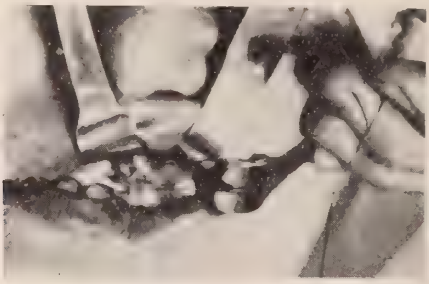


Fig. 12

(Fig. 12.) This slide shows the method of putting in the ten day chrome gut suture. The suture is placed and tied. I do not rely upon the gum tissue to hold the sutures, but pick up the periosteum in my sutures, so I am sure of having a good hold for the stitch. After the first stitch is tied, start the running suture with a lock stitch and suture the flap to place, leaving the mesial end of the wound open. Pack sterile gauze, saturated with tincture of benzoin compound into the crypt through the mesial opening.

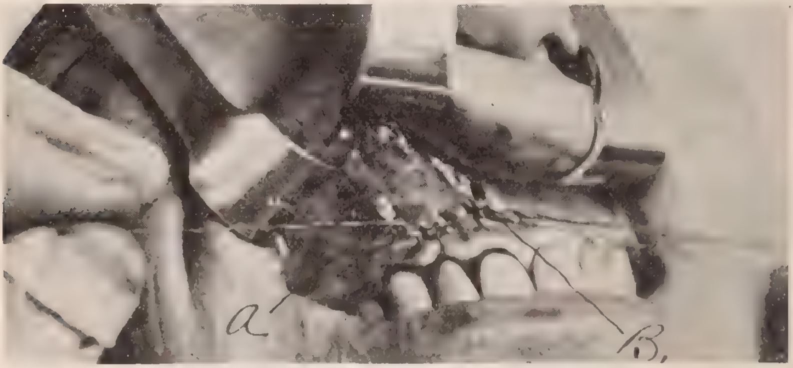


Fig. 13

(Fig. 13.) This shows the gum tissues and periosteal flap in place. Here (a) is the free end of the first stitch, and here (b) is the other end of the line of suture. This slide illustrates the completed operation.

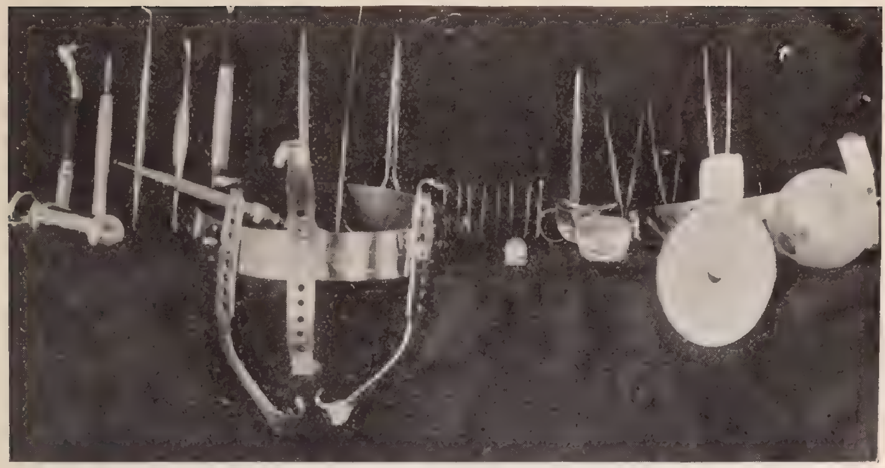


Fig. 14

(Fig. 14.) This slide shows the instruments which are used in the operation. I always work by reflected light from a head mirror reflector, and reflect the light into the cavity.

NOTE—Since this demonstration was given I have improved the technic by using interrupted sutures of horse hair. The chrome gut running suture occasionally sloughed out, but the interrupted horse hair sutures invariably hold.

All of the sutures—usually six in number—are placed insitu before any are tied, the free ends of each suture being held by an haemostatic forcep. Then the first one at the distal extremity of the wound is tied, then the one next to it and finally all in notation until the final one at the mesial extremity is fixed. We do not pack the wound at all with sterile gauze saturated in tincture of benzoin compound as before. Just before placing the sutures the crypt is bathed with tincture of iodin and then the sutures are placed and tied, entirely closing the wound, relying upon the antiseptic properties of the blood clot which forms under the flap, within the crypt, to preserve asepsis of the closed, sterile wound. The horse hair sutures are cut, leaving the free ends one centimeter long and the knots are all pulled to the lower side of the line of incision. The sutures are taken out upon the sixth day and only a white scar line about one half of a m.m. wide is left upon the gum. A mouth wash of Phenol Sodique ½ dr. to Aqua Dist. 3 oz. every three hours is prescribed for the patient.

Hume-Mansur Bldg.

Turn About

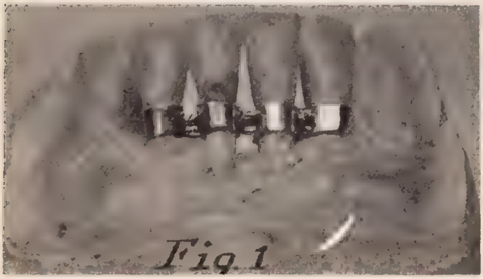
Hokus—"Toothache, eh? I'd have the blamed thing pulled if it were mine."

Pokus—"So would I, if it were yours."

A NEW RETAINER FOR PYORRHETIC TEETH.*

BY ALDEN J. BUSH, D.D.S., COLUMBUS, OHIO.

ILLUSTRATING a retainer or splint applied February 27th, 1915, for the retaining of pyorrhetic teeth which demanded complete surgical rest.



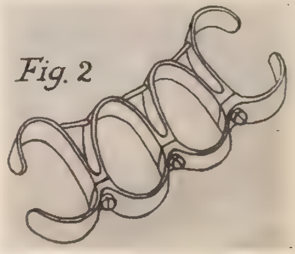
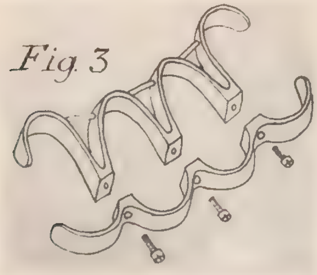
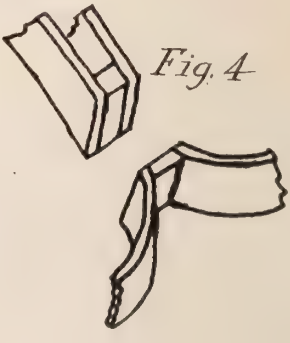


Fig. 1. Shows the appliance clamped to the teeth of the model upon which it was constructed.





Figs. 2 and 3 illustrates method of construction.

Fig. 4 shows detail of construction.

The appliance is made of iridio-platinum, soldered with pure gold. The small screws, together with the necessary drills and taps for same, can be obtained from the Columbus Dental Manufacturing Company (Steele's bridge repair outfit.)

This splint does not require the devitalization of pulps or mutilation of the teeth involved. It is efficient, delicate and inconspicuous and can be easily removed, if in the course of time, any of the teeth in question may seem to demand a more radical procedure.

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*Given as a clinic, Ohio State Dental Society, Columbus, O., December, 1915.

SOME PROBLEMS IN MOUNTING ARTIFICIAL DENTURES.*

BY GEORGE H. WILSON, D.D.S., CLEVELAND, OHIO.

Synopsis of paper: 1st. Definition of terms. 2nd. Anatomy and physiology of the organs involved. 3rd. Movements of the mandible necessarily involved. 4th. Instruments for mounting artificial dentures. 5th. Technic of mounting the teeth. 6th. Esthetics.

THE THREE TERMS—Articulation, Occlusion and Antagonization—are wrongfully used indiscriminately. Articulation applies to joints; joints are fixed or movable and they have a permanent relationship. Teeth articulate upon their approximal surfaces only, not upon their morsal surfaces. Occlusion pertains to closure—to shut in; therefore, is applicable to the relationship of the teeth of one jaw, while in contact and at rest, with the teeth of the opposite jaw. Anatomical occlusion requires a knowledge of the alignment and inlocking of the teeth, but has nothing to do with their movements. Antagonize—oppose, therefore antagonization of teeth is the relation of the teeth of one jaw to the teeth of the opposite jaw when in action. In naming the operation it is necessary only to say Anatomical Antagonization, not Anatomical Occlusion and Antagonization; as artificial dentures cannot anatomically antagonize unless they first anatomically occlude, antagonization includes occlusion.

The anatomy of the parts involved consists of the temporal, maxillary bones and mandible; temporo-mandibular joint, formed by the glenoid fossa and eminentia articularis of the temporal bone, and the condyle of the mandible, fibro-cartilage, ligaments and synovial sacs; four pairs of muscles of mastication—temporal, masseter, external and internal pterygoids, with the auxiliary muscles of the tongue, throat and cheeks, and the teeth. The naming of these parts is all that is necessary for the anatomy; however, the physiology requires enlarging upon.

The temporo-mandibular joint is a peculiar one, it is remarkably adaptable. The bones are separated a considerable distance by the interfibrocartilage and two synovial sacs. The bones do not control or direct the real or short movements of mastication, but the bones and ligaments direct and restrict the exaggerated or long movements of the mandible. The muscles and teeth entirely control the short movements of mastication. No movement of mastication is of vital interest to the prosthetist until two opposing points (either edge or cusp) touch, and then they are most important. The temporo-mandibular joint is like a mortar and pestle—the mortar has a larger concavity than the pestle has a convexity; so is the joint, but this difference is greater than is visible when the dry bones are placed in contact, for in their normal condition they are separated by the intervening fibro-cartilage and synovial sacs. There is no fixed rotating center in this joint as is made in all hinge-joint occlusion frames and most of the so-called anatomical antagonizing instruments. The movements of the condyle are possible to a greater or lesser extent, in every conceivable direction. The distal movement is usually much less than the other horizontal movements in their extremes but not in the antagonizing movements; however, the writer has seen a few cases in which there seemed to be, and he is confident there was, a distal movement from the normal rest position of one-fourth or three-eighths of an inch. These extreme cases are quite rare, but perplexing to the prosthetist when restorations are required. These rare cases should not be confused with those cases which have assumed temporarily a false rest position. It should be borne in mind that the length of movement, in any direction of the condyle after two opposing teeth meet, is so short and complex that it cannot, because of its environment, be measured. It is true that the establishing of the normal rest position of the condyle is the most uncertain data required in denture making, and that it is due to the personal equation of the patient, there can be no doubt. This personal equation my be classified as, first—those cases in which the patient has a preconceived opinion of how to get a certain result which has been determined upon, and second, the inability of the patient to control the muscles of mastication. This second class constitutes a strong argument for the theory that the tactile sense of the teeth is the controlling influence of the movements of the mandible, and that where the teeth are lost the patient largely loses the control of the movement of the jaw because of the loss of this tactile organ.

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*Read before the Ohio State Dental Society, Columbus, Ohio, December, 1915.

The physiology of the four pairs of muscles of mastication is very interesting for it explains the various movements of the jaw and shows that the movements are complex and not a simple open and shut movement. Each set of the four muscles is divided into two opposing pairs; as the temporal and external pterygoid and the masseter and internal pterygoid. The temporal muscle is a powerful muscle to draw the mandible upward and backward; while the external pterygoid draws the mandible forward and also obliquely inward. The masseter is a very strong muscle drawing the mandible upward and laterally outward; but it is not as powerful in its lateral action as is its opponent the internal pterygoid. This is a wise provision of

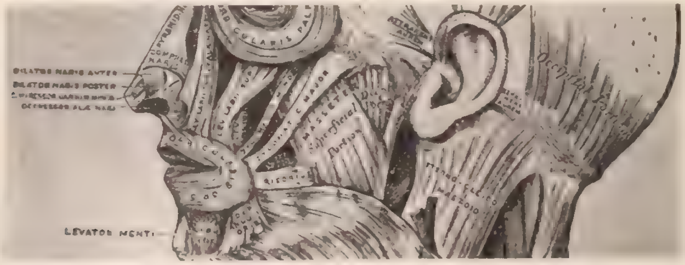

Fig. 1. Masseter muscle—origin upon the malar bone, zygomatic process of the malar and temporal bones, insertion upon the ramus of the mandible. Its action is to draw the mandible upward and somewhat forward as well as outward.

nature for when the masseter of one side of the face is called upon for its lateral action it is strongly assisted by the internal pterygoid of the opposite side of the face, which because of its long leverage has a stronger and better controlled action. It is instructive to note that the masseter and internal pterygoid on the same side, form a truncated triangle with their outlines, using their origins as a base and their insertions to describe the truncated apex. The base of the triangle formed by the origins of the two muscles is nearly two inches long, while the truncation of the triangle formed by their insertions is approximately one-half inch long, thus it is easily understood how the lateral movements are produced. Notice that these four pairs of muscles of mastication have no power to open, or depress the mandible. This action is produced by the muscles of the throat and by gravitation. The principal muscles involved in this movement are the digastrics and platysma myoids. Also notice that the temporal muscle only draws the mandible backward, and, that the anterior fibers of the temporal and the other three have more or less of the forward drawing movement. It is quite evident that the mass of muscle fibers drawing forward is greater than the portion of the temporal drawing backward, therefore the resultant of these combined forces is anterior to the right angle. This is proof that the cusps and inclined planes are the important factors in guiding the teeth into normal occlusion; also that the tactile sense is exerted by or through the cusps, and is a logical reason why the cuspids are more prominent than the other teeth. They are the feelers in prehension.

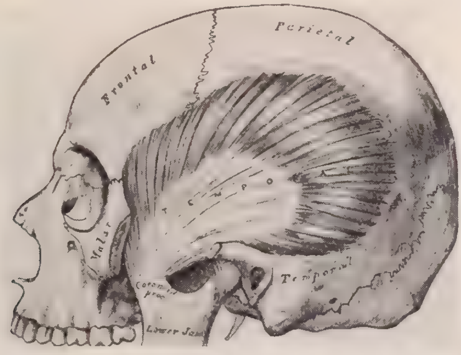

Fig. 2. The temporal muscle arises from the entire surface of the temporal fossa of the frontal, parietal and temporal bones and is inserted on the coronoid process of the mandible It is a powerful muscle to draw the mandible upward, and is the only muscle which draws the mandible backward.

The movements of the mandible are designed for two physiological functions, prehension and comminution. Prehension is taking hold of and drawing in food, and comminution reduces it to small fragments. The architecture of the mandible is most admirable as its lines of force are to gather the food, crush it and pass it on toward the stomach.

The cusps and planes of the teeth are assumed to be (not questioned by the writer) the guiding influence in bringing the teeth into normal occlusion. The cuspids are the important ones in determining the direction of the abrasion of the morsal surfaces of the natural teeth and of the length of cusps required in artificial ones. It is a debatable question whether artificial teeth should have long or short cusps. Undoubtedly a forty-five degree angle of the cusps of the first bicuspids and all other teeth in harmony with them give, theoretically, the greatest cutting efficiency; but it is quite

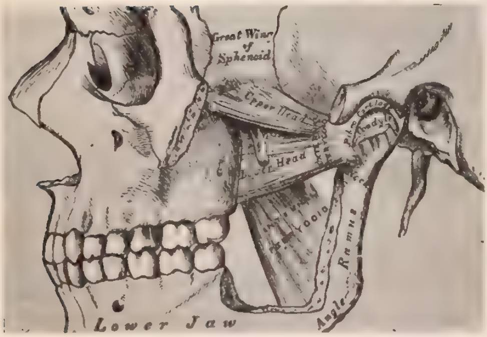

Fig. 3

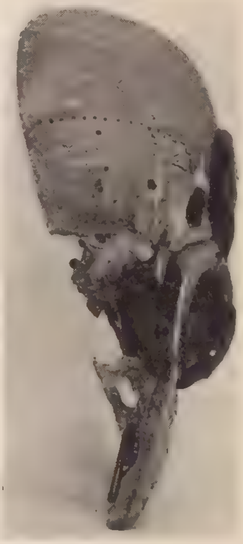

Fig. 4

Fig. 3. The external pterygoid arises from the greater wing and the external plate of the pterygoid process of the sphenoid and is inserted about the neck of the condyle and the fibro-cartilage of the temporo-mandibular joint. Its action is to draw the condyle forward and obliquely inward.

The internal pterygoid arises from the pterygoid fossa and is inserted into the inner surface of the ramus of the mandible. Its action is to draw the mandible upward, forward and inward. As these four pairs of muscles of mastication may act singly, in pairs and conjointly, the mandible may be drawn in any conceivable direction except downward, which direction is controlled by another set of muscles.

Fig. 4. This figure shows the half of a skull with the masseter and internal pterygoid restored in wax. The triangular section of these muscles, or the truncated rectangular pyramid, can be readily conceived. The angle of the mandible is in the center of the truncation.

probable the inclination of cusps produces instability of the lower artificial denture. A lateral sliding movement is a very painful one in those extensively resorbed cases where the surface of the bone has minute nodules and sharp ridges over which soft tissues are forced by the gliding hard base-plate. In such cases (and there are many of them in an exclusive prosthetic practice) the unfortunate patient intuitively learns to avoid a triturating movement of the mandible, and depends upon an up and down movement only. If these patients do not learn to avoid the lateral triturating movement they pester the life and severely try the patience of the prosthetist. It is the experience and judgment of the writer that long overlapping cusps should not be used with flat excessively resorbed processes and sharp ridges. An axiom may be stated thus: Flat processes require short cusps and short overlap; full and rounded processes require long and sharp cusps and long overlap. Following this rule will usually be conducive also of the requirements of esthetics, although there are exceptions.

The movements of the mandible necessarily involved in the construction of artificial dentures are: The backward movement of prehension and the triturating movements of comminution, or mastication.

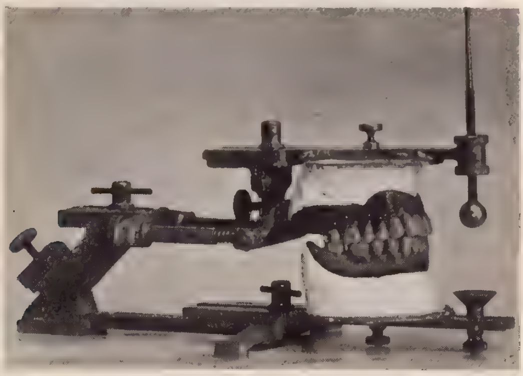

Fig. 5. The Hall antagonizer with the support pin reversed and in position for antagonization grinding. Notice the occlusion of the teeth in this practical case, also the small amount of restoration required as shown in this and the two following slides. A contrast will be shown in slides 9 and 10. [illegible]

To construct an instrument to meet the requirements of these movements has certainly been a proposition that has surely taxed the ingenuity of the inventors beginning with Gariot in 1805; Evans' slotted joint instrument in 1840 (first attempt at anatomical construction), and Bonwill's geometrical studies and instrument in 1858. We honor Dr. Bonwill for his extensive studies and certain anatomical discoveries. However, the writer

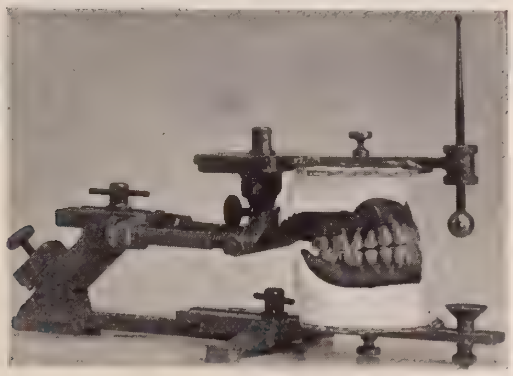

Fig. 6. The same case in incisal occlusion.

questions all of his geometrical studies appertaining to the triangle. Certainly he opened a flood-gate to imitators that has resulted in much confusion. Unfortunately Dr. Bonwill seems, at this later day, to have been more impressed with geometry than with anatomy and physiology. His error was in giving any consideration whatever to the opening movements of the mouth, whereas, the closing movements only are of practical interest to the prosthetist. Dr. Bonwill did valuable work in his studies of anatomical occlusion; he gave a clear exposition of the alignment and inlocking of the teeth. If Dr. Bonwill was at fault in endeavoring to explain the movements of antago-

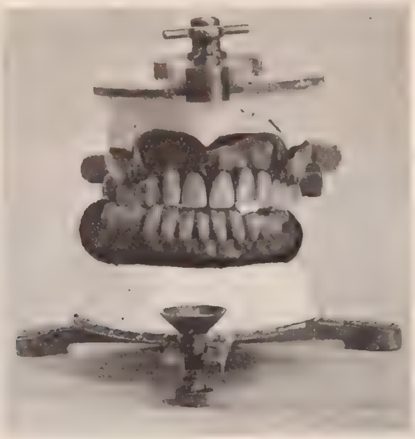

Fig. 7. Left lateral occlusion. The peculiar construction of this instrument makes it remarkably efficient and simple for the antagonizing or milling movements.

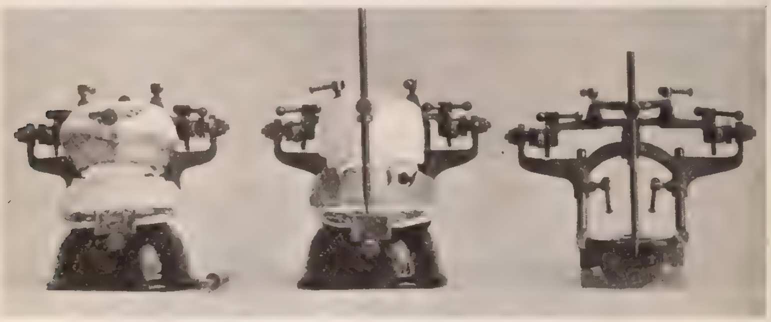

Fig. 8. Showing the three widths of the "Acme articulator." The wide one is shown upon your right. It is four and one-half inches from one rotation center to the other rotation center. This is also shown with the bayonet upper and the long lower bows. It is also standing upon the tin support, which is provided with these instruments, to be used in mounting the casts. The middle one has a regular four inch base line. The casts are separated to better show the Spence plaster compound lower cast and upper plaster occlusion cast which are to be used in constructing a partial lower denture. The remaining instrument has a 3 and $\frac{5}{8}$ inch base line between the rotation centers, and has the support pin removed. It is carrying a Spence plaster compound upper cast and plaster lower occlusion cast over which a continuous gum denture was constructed The face-bow for this set of three instruments is an ingenious modification of the well known one of Dr. Snow's. The face-bow is used also as calipers for measuring the width of the mandible, which measurement is used in selecting a suitable base frame.

nization by the use of geometrical figures, then his followers in that line of investigation have only the more bewildered the confused mind of the profession. When Mr. Norman G. Bennett of England, demonstrated the lateral mandibular movement, he disposed of the foundation of the triangle theory, because this lateral movement destroys all possibilities of a fixed rotating center in the temporo-mandibular joint. The temporo-mandibular joint is a remarkably adaptable one, and permits a limited movement in every conceivable direction. This implies that it is designed to accommodate itself. Accommodate to what? Certainly it must be the prehensive and milling movements of the mandible, the first essentials of life.

In the estimation of the writer the face-bow is the most important invention ever made for the mounting of artificial teeth, because it establishes the relationship of the different parts of the mandible to each other; but it does not establish any relationship of one jaw with the other. The use of this instrument permits the opening and closing of the bite, which cannot be done with any degree of safety when it is not used; and it mounts the casts in correct relationship in the antagonizing frames.

INSTRUMENTS FOR MOUNTING ARTIFICIAL DENTURES.

For mounting teeth in anatomical occlusion any instrument will suffice, a barn-door hinge, or plaster blocks made by extending the casts backward.

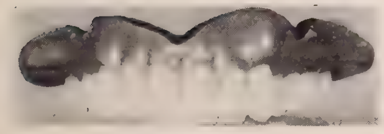

Fig. 9.

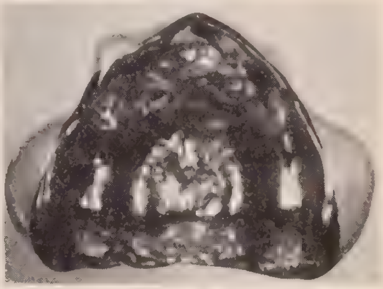

Fig. 10.

Fig. 9. This slide, nine, and the following one show a large amount of restoration. Certainly such restorations demand some esthetic sense or they had better not be attempted. The wax contours must be formed at the chair.

Fig. 10. This view gives a better idea of the amount and form of the contours. Notice that the pairs of contours are not symmetrical. The left cuspid eminence is much greater than the right. The right buccal restoration is larger and of different form than that upon the left side.

Dr. Bonwill made some valuable discoveries in the alignment and inlocking of the teeth. Professor Gysi has very clearly instructed how to set artificial teeth to have them anatomically arranged. He instructs to set the six upper anterior teeth to the Bonwill dental circle, with the bicuspids and first molars over the crest of the alveolar process, and in diverging straight lines backward. The lingual cusps of the upper first bicuspids are slightly above the horizontal plane of the buccal cusps, the cusps of the second bicuspids are in their common plane, the lingual cusps of the first molars are below the plane of the buccal cusps, while the lingual cusps of the second molars are still more depressed, also the second molars are slightly rotated inward from the diverging lines of the preceding teeth. He instructs, the incisal edge of the lower incisors shall glide upward on the lingual surface of the upper incisors. The lower cuspids are slightly lingual and mesial to the upper cuspids; the distal plane of the lower first bicuspids occludes with the mesial plane of the upper first bicuspids; the second lower bicuspids occlude with the upper first and second bicuspids; the lower first molars with the upper second bicuspids and first molars; and the lower second molars with the upper first and second molars. The normal arrangement of the natural teeth have the lower cuspids, and the teeth posterior to them, mesial to the corresponding upper ones. By this means the returning prehensile movement brings the distal surface of the lower cuspid, upon the work side, in contact with the mesial lingual plane of the upper cuspid and the tactile sense of the cuspids guides the organs into their milling, or comminuting position, when the united contraction of the muscles of mastication completes the operation. In advancing years the angle of abrasion will be determined by the amount of overlap of the cuspids; and, the mesial incisal edge of the upper cuspids and the distal incisal edge of the lower cuspids will be much elongated. It is the lateral pressure produced by the inlocking of the inclined planes that causes the loss of even a single tooth to be so destructive of efficiency of the teeth upon that side.

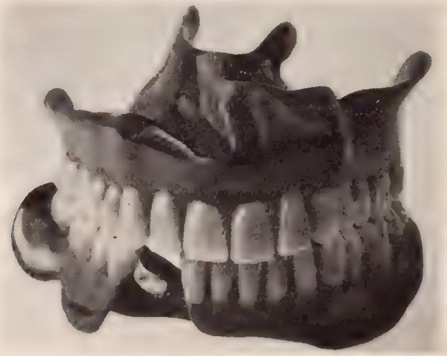

Fig. 11. The remaining three slides show views of a difficult case. The gentleman for whom the appliance was made is in middle life. He has a congenital complete cleft and is edentulous save the lower right cuspid, which is firmly attached, rotated and tilted mesially. There is a heavy muscle attachment extending to the crest of the process under the lower right first molar. This appliance was constructed upon the Hall instrument, and nothing done to it at the time of insertion except a slight adjustment of the clasp. This is a roofless plate for a roofless mouth. No attempt was made to restore the cleft, as such was not desired, and undoubtedly little if any benefit, would have been secured for his speech. Notice the flanges are shaped so as to aid in retention.

The mounting of artificial teeth presents some problems different from those involved in the natural teeth. Undoubtedly, the tactile sense is largely lost with the loss of the cuspids and this explains the uncertainty of the normal rest position of the condyle in edentulous persons. Greater cutting efficiency would be more desirable in artificial than in natural teeth, because the artificial ones, resting upon the gum tissue, have not the resistance to force that is exhibited by the natural teeth imbedded in their sockets.

The lateral movement caused by the inclined planes causes a sliding movement of the base-plate especially when there is little or no alveolar process remaining. Hence, in many cases it is necessary to sacrifice much of the cutting and triturating efficiency of the artificial dentures for the sake of the comfort of the patient while using the substitutes. However, advantage should be taken of our knowledge of physical laws to secure the greatest consistent efficiency possible in mastication. This being true something more is required of the prosthetist than normal occlusion.

INSTRUMENTS FOR ANTAGONIZATION.

The discoveries by various men, within the past thirty years, have made comprehensible the movements of the mandible. Recently the advanced thinkers interested in this subject for study, have recognized that the theoretical rotation centers are back of the base line of the so-called equilateral triangle. Some of these investigations have placed this theoretical rotation center as far backward as the occipital protuberance.

Dr. Rupert E. Hall of Houston, Texas, has invented an instrument upon this principle, and the S. S. White Dental Manufacturing Co. are about to place it upon the market. For some months the instrument has been in the hands of certain prosthetists for proving up. The writer feels justified, with more than a year of observation of Dr. Hall's work and his own recent tests of it, in saying that this is the instrument he has long desired—that it is more efficient, practical and simpler than anything heretofore produced. The only measurements required are establishing the theoretical equilateral triangle with the Snow face-bow, measuring the perpendicular of the triangle and setting the antagonizer to it. The antagonizer is simple and positive in all its parts. Upon it the teeth may be mounted to a flat occlusal plane, or with the longest conceivable cusps and overlap and then the dentures may be removed from the instrument, placed in the mouth and reproduce the action obtained on the instrument. Thus far the method and instrument have surpassed anything the writer has elsewhere seen. The instrument is somewhat cumbersome and heavy, but its possibilities are so great where porcelain antagonizes with porcelain that the prosthetist can well afford to overlook these slight inconveniences.

The writer has been partial to the Snow "New Century Articulator" since it was first placed upon the market. He is pleased to say that this very valuable instrument is soon to appear upon the market in an improved form, and it is to be known as the "Acme." The "Acme" has been adopted by the writer for all cases where porcelain is occluded against plaster, because of its lightness and convenience in handling. All of the movements of antagonization can be produced with the "Acme," but not as accurately or easily as with the "Hall."

Thus far this dissertation has dealt with the science and mechanics of mounting artificial teeth only, but the writer would not feel that he had done his full duty if he did not add a few words upon the esthetic side of the construction of artificial dentures. The science and mechanics may be well cared for by the laboratory man, but not so the esthetics. The esthetics can be developed by the operator (prosthetist) at the chair only. Otherwise, the creation cannot possess an esthetic or art value. However, a description of the esthetics of prosthetics is a subject by itself and not opportune at this time.

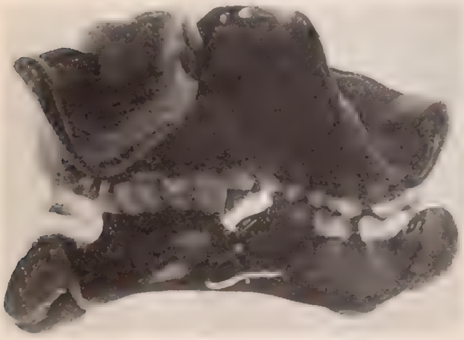

Fig. 12.

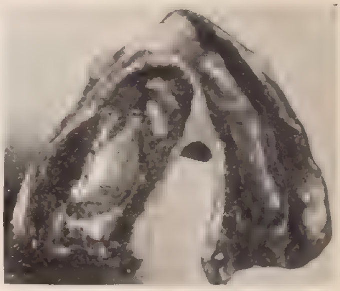

Fig. 13.

Fig. 12. A rear view showing the outline.
Fig. 13. Showing the maxillary surfaces of the upper base-plate.

The writer personally requests that those discussing this paper do not express their personal opinions or intrude their personal methods of procedure, but that they confine their discussions to anatomical, physiological physical and logical facts. The writer will be grateful for any just criticisms, corrections or pertinent facts.

DISCUSSION.

Dr. H. V. Cottrell, Columbus: The essayist requests that those discussing the paper "do not intrude their personal methods" yet invites "criticism and statement of pertinent facts."

There is really very little that can be said in discussing this paper except to commend the author for his full treatment of the subject—not probably in an exhaustive manner, but sufficiently so for the purpose for which it was written. His attempt to change the nomenclature of the subject does not meet with our approval entirely. His coined word "antagonization" is a somewhat cumbersome term and to our mind carries with it a meaning more or less misleading. With antagonization is associated the idea of combat, antipathy, counteraction, foe, competitor. While the relation existing between the teeth in one jaw and those in the other is rather that of correlation. The teeth in opposite jaws are working together to accomplish a certain result—the comminution of food. They are not competitors.

By the essayist speaking of anatomical occlusion, normal occlusion, incisal occulsion, lateral occlusion, etc., we might be led to think that he only deals after all with occlusion, and that his coined word—antagonization, is a supernumerary to him, since a series of his occlusions logically arranged in photographic film would produce the motion he desires antagonization to cover.

We know that words come in time to have new meanings or new shades of meanings by the common use of them. The term "articulation" as referring to relations of opposing teeth is a term which by use has come to be understood, and we think will remain with us.

It would seem that the essayist minimizes the importance of the condyle path in denture construction by saying "it should be borne in mind that the length of movement in any direction of the condyle after two opposing teeth meet, is so short that it cannot be measured," and that the temporo-mandibular joint is such a very adaptable one that it is capable of accommodating the movement of the mandible to the planes of the teeth. We should therefore expect to find that in forward protrusion for instance, there is always a sliding of the cusps over each other whatever the path may be, but the pertinent fact remains that we do not always so find it after insertion of dentures unless we have measured the first short portion of the path and adjusted our articulator accordingly. Without having taken advantage of this finding, we may observe the complete loss of the balancing contact in our dentures when in the mouth. (Fig. 1.)

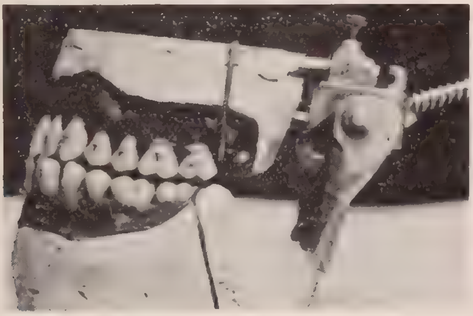

Fig. 1. These teeth are mounted so that when the condyle path is horizontal, proper balancing contact is seen in the molar region. When the condyle path is inclined, complete loss of balancing contact is observed as above.

All our dentures, both plate and bridge, all crowns, all inlays, all fillings, involving occlusal surfaces, are given their final tests as to form by the different protrusions of the mandible. It is therefore important that these movements be as nearly correct in the articulator as it is possible to have them. We cannot have an articulator which in every way duplicates the movements of the mandible, but the essential movements may be closely imitated by one or two instruments now on the market. However we welcome any additions or improvements in this field.

The logical system of arranging the teeth has been very well described, and requires no comment.

The personal equation of which he speaks and which enters into our attempts to establish the resting position of the condyle, compels us to exclude methods which call attention of the patient to the fact that a closure of the mouth is desired to be made in some certain way.

We think the complaint made that there is lateral sliding movement of the lower denture in extensively resorbed cases caused by inclined planes of cusps is pertinent only in a small percentage of cases. An accurate adjustment of the teeth in their lateral movement toward anatomical occlusion will provide very efficient resistance to this sliding under force of mastication, since the motion produced in the denture is the resultant of the forces applied against the denture, and is practically vertical in its direction. (Fig. 2.) However, this can only be a matter of judgment and observation in the absence of mathematical computation of these forces.

Again we desire to express our appreciation of the paper in general. It shows a thorough knowledge of the principles underlying this phase of prosthesis.

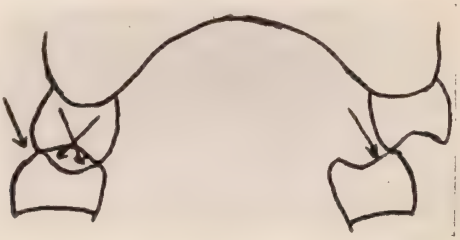

Fig. 2. The parallel forces exerted against the lower denture are in evidence as the mandible swings from position indicated above to that of anatomical occlusion. These forces probably balance the force exerted in mastication as indicated by the remaining arrow. The direction of motion in the lower denture is therefore vertical, the resultant of all these forces.

Dr. L. L. Sheffield, Toledo: Dr. Wilson's paper is a most excellent one and deals in a masterly way with the subject at hand beginning with a suggested change in our nomenclature from anatomical occlusion to anatomical antagonization. The essayist speaks of cases that have a distal movement from the normal rest position. It has been my lot to observe four cases of this kind and in each event it was necessary to set the lower model some distance mesially to the most distal position obtainable allowing the patient to designate the normal rest position and rebuild the dentures.

It would be hard to mention anything more preplexing than a patient with this condition to overcome but when dentures are made for these patients with normal rest position properly located they have no more than the usual inconveniences in learning to use them.

The essayist deals with a part of this subject from a stand-point which permits of no discussion, e. g. definition of terms, the anatomy and physiology of area involved.

In choosing an instrument for antagonization I have used the Snow, and followed it through its different stages of development and obtained the improved instruments as fast as placed on the market. Have also the Gysi.

With the Snow, New Century articulator, there is too much play in the condyle slot, allowing a discrepancy in equalizing the pressure on either side of the artificial dentures and sometimes necessitating partial resetting in the mouth when trying in, but this instrument when using the anatomical moulds of the Dentist Supply Co. is an expeditive where time is an essential factor in constructing a denture.

When accuracy and efficiency are wanted, and by using the True-Bite Moulds, the writer is able to get results that have been impossible with the previously mentioned articulator. I wish to thank Dr. Wilson for his paper, for it will be of great benefit to many of us, and help us over stony places in denture making.

Dr. Rupert E. Hall: I have recently done some investigating along this line, and had I known that I should be here I would have tried to get on your program for a clinic. I have some schematic models with me and believe I can demonstrate to you that the theory of the condyle path as we know it is a fallacy, and practice based upon it an error. It is an important factor, but it is not the one determining and controlling the mandibular movements in the grinding and triturating masticatory process. The angles, planes and positions of the teeth in the arches and the action of the muscles are the determining factors that guide these movements of the mandible, and not the condyle paths. The condyles themselves are only a part of the masticatory apparatus, comparable to the part of a wagon, which for its movements in traveling must have a road upon which to rest and move; the planes of the teeth are the road in this case, not the path of the condyles. This does not mean that the movements of the condyles are not harmonious; they are very harmonious, and work in perfect coordination with the other movements of the mandible, just as do the parts of the wagon in their movements upon the road, adapting their movements to changing conditions as the wagon progresses up or down on grades or rolls along smoothly upon the level road, as may be required.

Two years ago, when I first became acquainted with the author of the paper just read to you, I found him doing as all the rest of the plate enthusiasts were—measuring and recording the incline or angle of the condyle paths upon and over the eminentia articularis, and using these measurements as a guide in the setting of the teeth—something that is entirely without effect upon the angles, planes and position of the teeth. Today in his paper just read to you he has told you that the tactile sense of the teeth guide and determine the movements of the mandible.

I have with me one of my articulators, in which are mounted casts of natural teeth demonstrating the controlling influence of the teeth upon the masticatory or mandibular movements. To the articulator in the region of the condyles I have pencils so attached that they will record what the condyle movements are. If you will look them over and see what this model demonstrates, I doubt not that you will understand and agree fully with the statement in Dr. Wilson's paper, namely—that the teeth guide the mandibular movements, and not the condyles. This claim, so far as I know, was first introduced and demonstrated at the National Dental Association in Rochester, by myself.

Furthermore, I have proved beyond doubt that the movements of the working condyle are as important as the movements of the balancing condyle, and that the grinding, triturating movements of mastication, when two or more teeth are in contact, do not produce condyle movements sufficiently extensive or intelligible to be measured, as Gysi attempts to do with his recording and measuring appliances. Gysi and all the other investigators have taken no cognizance of the movements of the working condyle. Their measurements and articulators have attempted to measure and record only the movements of the balancing condyle and the incisor point or apex of the Bonwill Triangle. Since it is an admitted fact that the mandible in its general form presents three points approximating those of the equilateral triangle known as the "Bonwill Triangle", and is further agreed that all three of the points of the triangle move in the masticatory process, is it not just as important that the movements of the third point—that of the working condyle—be recognized, determined and recorded, that they may be utilized with the other movements, as it is to try to determine and utilize the movements of the other two points? Surely it is—no other answer could be given.

That which will surprise, astound and interest you most will be to find that the condyle path is in reality not a path at all, but a multiplicity of lines and "wiggles" all run together. When the movements of the masticatory process are complete the pencil recordings form a dot or ball, showing that the condyle movements are not movements in a fixed direction—line or curve, but are rotary—ball-and-socket, and demonstrate, in fact, that the temporo-mandibular articulation is a moving or floating joint.

I believe and have demonstrated, that the records gotten by the Gysi recording and measuring appliances and the Christensen method of determining the condyle paths are a fallacy, not in the least reliable or representative of what the condyle movements will be when the dentures are inserted and the mandible is given support and guidance by the angles, planes and positions of the teeth.

Gysi finds an average downward condyle path of $33\frac{1}{3}°$ for all the mandibular movements, including the incisive movements. I find and have proved that the incisive movements have for their workings two axes entirely independent of the axes or centers controlling the lateral movement of Bennett, and that artificial dentures constructed upon typical normal lines as found in Nature call for a condyle path in the incisive balancing bite of approximately only three to five degrees; while the lateral movements have a varying range between three and forty-five degrees, depending upon the varying combinations of the lateral and incisive movements, as determined by the angles, planes and positions of the teeth and the action of the muscles.

THE ANATOMY OF THE ORAL CAVITY IN ITS RELATION TO LOCAL ANESTHESIA.*

BY HUGH W. MAC MILLAN, D.D.S., CINCINNATI, OHIO.

LOCAL ANESTHESIA is especially indicated in those regions where the nerve supply of the part is readily accessible to the needle. By injecting novocain into or around the nerve trunk supplying the part, an anesthesia can be produced in all parts of the nerve peripheral to the injection. The essential principle of conductive anesthesia is to deposit the anesthetizing solution in the closest proximity to the nerve supplying the part, hence an accurate knowledge of the anatomy of the nerves supplying that part is necessary for rational procedures.

In the eight upper anterior teeth the closest proximity to the nerve can be had just above the apex of the tooth. Hence it will be necessary, in anesthetizing these teeth, that we study the structure of the tissues around the apex. It is absolutely unnecessary, under normal conditions, to use the infraorbital injection for operations on the eight anterior teeth. For more extensive operations, as the removal of tumors, correction of harelip, or in edematous conditions, the infraorbital injection can be used.

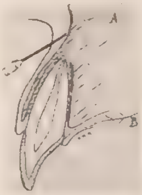

Fig. 1. Diagram showing nerve supply of the structures around the tooth Note the division of the dental nerve about the apex of tooth. A. Dental nerve. B. Palatal nerve.

By observing skulls we find that the apices of the upper eight anterior teeth, with the exception of the lateral, are covered with only a thin layer of bone. In fact the apices of these teeth are sometimes bare. The dental branch follows down just within the outer plate of the maxilla and divides before it enters the pulp canal. (See Fig. 1). These divisions of the nerve supply the pericementum, cementum, alveolar process, periosteum and labial mucosa surrounding the tooth. By entering the needle in the fold formed by the lip and gum and inserting it along the bone to a point just above the division of the dental nerve which is just above the apex of the tooth to be operated upon, we can by this one injection anesthetize all the tissues supplied by this nerve. For extraction of these teeth, this one injection combined with a few drops injected in the lingual mucosa will render the operation painless.

If the injection is made only in the gum tissue in the usual manner the tissues at the apex are not anesthetized and hence the patient feels pain when the apical attachment is torn loose with the forceps. Forcing the needle in the dense gum tissue is exceedingly painful. Forceful injection of the solution with a heavy syringe in the gum sometimes causes a stripping away of the periosteum from the bone which results in sloughing due to the cutting off of the blood supply. By inserting the needle at the junction of the lip and gum (See Fig. 3) the injection can be done painlessly, as the tissues are less dense, will produce a thoroughly anesthetized operative field and will forestall any untoward sequences if properly done.

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*Descriptive clinic at Ohio State Dental Society, Columbus, Ohio, December 1915.

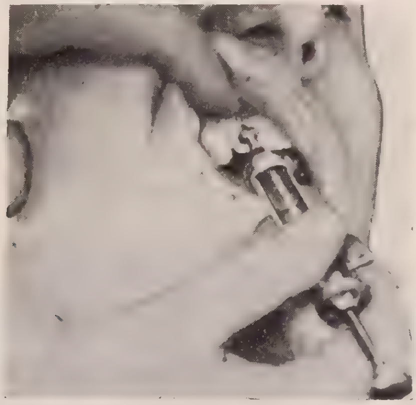

Fig. 2. Position of index finger of left hand in making injection of upper anterior teeth.

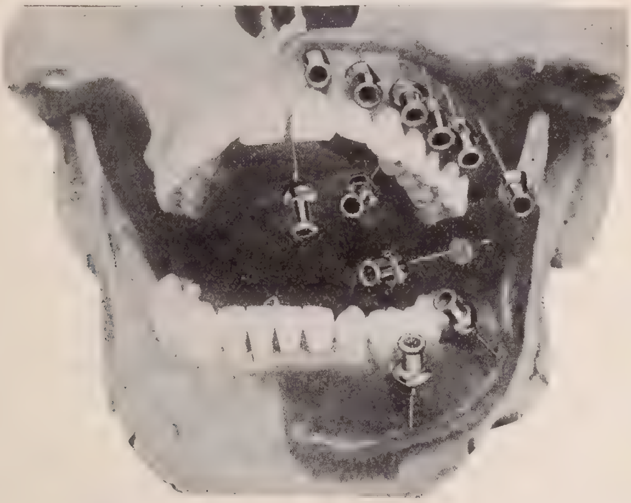

Fig. 3. Injection of the mandibular nerve, mental nerve, and dental nerves of the upper teeth. Note relations of the soft tissues in the posterior part of the mouth to the needle.

Before complete anesthesia is present in the pulp of the tooth it is necessary that the novocain be absorbed through the perineurium to the center of the nerve supplying the part. In the upper eight anterior teeth the nerve can not be reached directly as it is covered with bone. It is necessary for the solution to pass through this bone and engage the nerve before perfect results can be claimed. To facilitate this, the following method of injection has proved efficient: (See Fig. 2.) Before inserting the needle the forefinger of the left hand is pressed firmly over the area to be injected and held there. The needle is then inserted in the tissues under the finger, carried to the required depth, and the solution is forced slowly into the tissues. The pressure of the forefinger will direct the solution through the periosteum and bone into the nerve trunk and produce the anesthesia in much less time. The bone is thicker over the apex of the lateral hence a longer waiting period or perhaps a second injection will be necessary for this tooth.

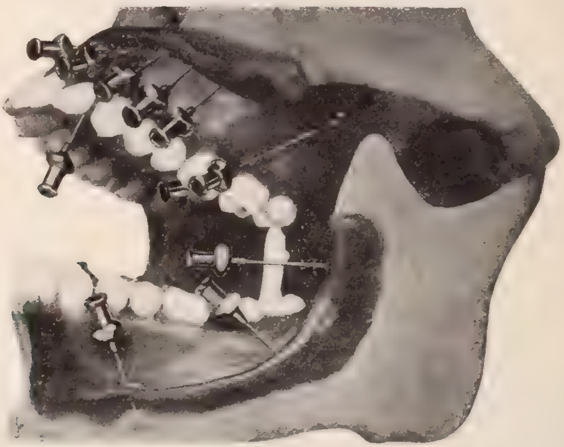

Fig. 4. Injection of posterior dental foramen for antrum and upper molars. Lower needles show injection of mental foramen and injection of buccal mucosa.

In any injection for local or conductive anesthesia the needle should not engage or be forced into the bone. It is only necessary to bring the needle into apposition with the bone. There should be no force applied in any part of any injection more than the initial insertion through the mucosa. If these directions are followed there can be no excuse for breaking needles in making any of these injections.

For operative procedures on the upper molars and antrum, the posterior dental nerve must be injected. The position of the foramen is seen in Fig. 4. Note that the needle is to be inserted not more than 1.5cm. To inject the posterior dental nerve palpate for the malar prominence from the inside the mouth, start the needle in the fold of the cheek opposite the second molar tooth and insert the needle along the bone for a distance of 1.5cm, when the posterior dental foramen will be reached. This injection may be done more easily if the patient's mouth is partly closed. For painless extraction of these teeth it is necessary to inject the posterior palatine nerve as in Fig. 4.

This is a very simple injection and should make all operative procedures in this region absolutely painless.

The lower jaw is supplied with the mandibular nerve which passes obliquely outward and forward from the foramen ovale to the inferior dental foramen. The whole half of the mandible is supplied by this nerve except a small area of the mucous membrane on the buccal of the lower molars. The lingual nerve, a branch of the mandibular, supplies the lingual surface of the mandible and also the tongue. This nerve may be anesthetized by the same injection for the mandibular nerve.

The position of the inferior dental foramen varies slightly in different individuals. In young patients where the angle of the jaw is nearly 90 degrees, the foramen is somewhat higher than in elderly patients where the angle is more obtuse. Likewise the angle formed by the union of the ramus and the body of the mandible varies in different individuals. These differences may be ascertained by careful observations before making the injection.

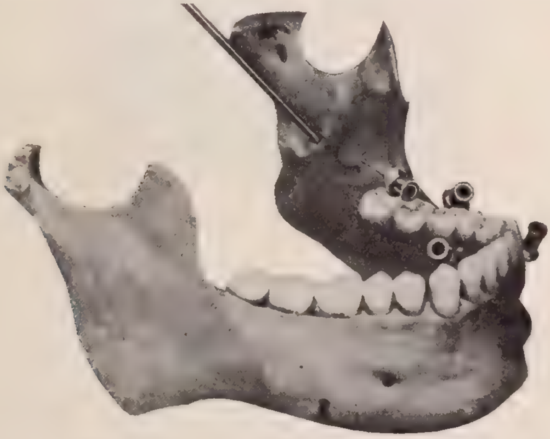

Fig. 5. Relation of the needle in the pterygo-mandibular space. The needles in the anterior part of the jaw show the injections for treating pyorrhea of the lower anterior teeth.

To inject the right mandibular nerve (See Fig. 4) the external oblique line of the ramus is palpated with the index finger of the left hand. The finger is then moved mesially until the rounded edge of the internal oblique line is found and the finger is allowed to rest in the interval between these lines. The point of the needle should be inserted 1cm. or approximately a finger's breadth above the line of the lower teeth at the inner border of the internal oblique lines using the palpating finger as a guide. The needle should not be inserted straight posteriorly but should follow the inner surfaces of the ramus. Experience has shown that resting the barrel of the syringe in the region of the lower cuspid tooth of the opposite side will direct the needle in the proper plane. The patient's mouth should be wide open. Injecting too low will cause a stiffness of the internal pterygoid, injecting too high will result in failure to reach the nerve as it descends obliquely from the skull.

When the needle has been inserted 5mm. a few drops should be injected to anesthetize the lingual nerve. The needle should then be carried back not further than 1.5cm. where 2cc. should be injected. Then inject 0.25cc. in the mucous membrane external to the molars to reach the buccal nerve, and in twenty minutes the jaw will become so anesthetized that any operation can be done painlessly upon it. When the Schimmel needle is used in making the mandibular injection the depth of the needle in the tissues can be gauged by the holder for the needle. A rubber washer should be kept on the plain needle, a distance of 1.5cm. or approximately three-quarters of an inch from the point, for a guide. If for any reason the needle should be broken off, the rubber washer also acts as a guard to prevent the needle from going further in the tissues. An accident of this kind seems unwar-

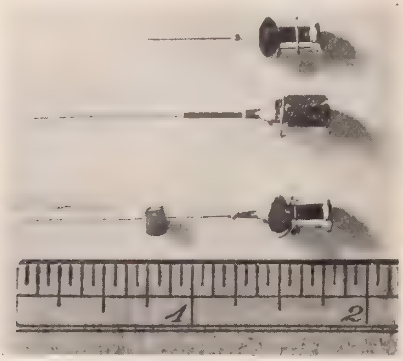

Fig. 6. Only two needles are necessary to make these injections, one long needle, either Schimmel or plain, for mandibular and posterior dental injections, and one short needle for the other injections. These needles are 24 gauge (B & S).

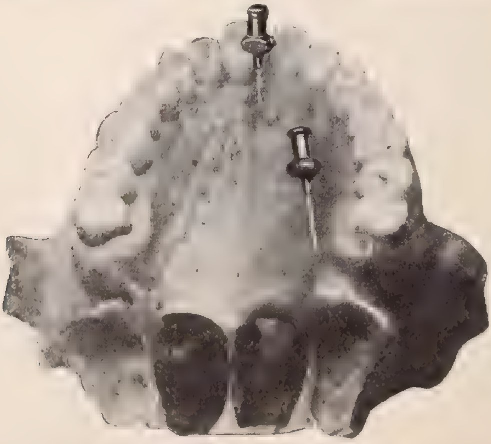

Fig. 7. Injection at anterior and posterior palatine foramina for operations on the palate.

ranted as no pressure is to be applied in any part of the injection except the initial puncturing of the mucosa.

It is not the purpose of this paper to give sufficient instruction to enable one to use conductive anesthesia without further study. Rather it has been the purpose to answer some of the many inquiries in regard to this method and to show the simplicity of the injections. Sterilization and instrumentation are wholly disregarded here as it is supposed that the reader has already studied one of the many text-books on this subject. The thorough discussion of local or conductive anesthesia is making this method standardized as will eventually result in every branch of the healing art.†

Andrews Bldg.

PRESIDENT'S ADDRESS.*

BY EDWARD C. MILLS, D.D.S., COLUMBUS, OHIO.

HUMAN ACHIEVEMENT IS MARKED by man's ability to accomplish things to an extraordinary degree; but the converse is true, that no man really acts independent of his fellowmen. Everywhere there is a social life, setting limitations and influencing individual action—whether it be political, economic, religious, educational or in any realm of human endeavor.

From the beginning, man has been obliged to struggle against the forces of nature for existence; physical environment has been subdued in order that he might continue to exist or, where these forces cannot be subordinated to his own life, he finds it necessary to adapt his life to meet these conditions. Egoism has characterized man's early struggle and his life has ever been influenced by it. While this predominated in the primitive history of man, altruism later attracted his course of life, growing stronger and more universal, until side by side exists the struggle of man for his own existence and his struggle for the existence of others; self-interest has been largely supplanted by mutual interest and altruism is now as much a part of the general scheme of this struggle for existence, as egoism. The moral life, involving thoughts, feelings, intuitions and actions, relating to man's association with his fellows, was a natural sequence and found an expression in ethics.

The individual who strives alone, is helpless, hence we see large numbers forming themselves into voluntary associations for specific purposes—having special services to perform—working, thinking and toiling to attain certain ends. Several elements are essential to progress—Purpose, Enthusiasm, Courage, Persistence! Goethe said: "The important thing in life is to have a great aim." The aim of this institution has been from its very inception, as noted in its original constitution, "the promotion of the honor, usefulness and interests of the profession, and the advancement and cultivation of professional science and literature, the encouragement of a more professional education and the protection of the public from the evils of empiricism." And, because of this splendid purpose in the minds and hearts of those who fifty years ago opened the doors of the dental profession on a wider horizon, there burned within them the fire of enthusiasm, which has spread, until today we, members of this association, are inoculated with the idea of *progress.*

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†A chart containing enlarged reproduction similar to figs. 3, 4, 5, 7, will be mailed by the author upon request.

*Read before the Ohio State Dental Society, Columbus, Ohio, December 1915.

Some may think only a genius could accomplish the results desired, and that for most of us there is nothing to do. Our greatest genius, the greatest our state has ever produced, Thomas A. Edison, it was, who said—"Genius is two per cent. inspiration and ninety-eight per cent. perspiration;" so, if we are all willing to bend to the tasks at hand, we can all be geniuses and make ourselves felt in a really vital way in the work of this association.

There was no lack of courage among those who gave birth to this association, nor of persistence in the maintenance of the work established.

The men who left us this heritage have all save three, Dr. C. H. Harroun of Toledo, Dr. W. P. Horton of Cleveland, and Dr. A. R. Lord, of Clyde, quietly passed from the living; but for years to come there will be flowers along the wayside of our and other's lives, which are the blossoms of their loyalty and faith.

Fifty years of existence is significant in human life. It indicates more or less regard to the laws of proper living, as mortuary statistics will evidence; in a mercantile enterprise, conservative business methods; in an organization such as ours, a community of interests, a desire for mutual improvement and a gain of public favor. The work of our founders was that of a builder who makes the plans, clears a place for the building, lays the foundation and then leaves it for other artisans to complete. Material of different sorts has been contributed by many, not dressed for the builders, but material that could be used when prepared.

On this Fiftieth Anniversary, it seems that a historical review of our association would be appropriate. Dismiss the prevalent idea that history deals simply and solely with the past; many peoples have lived and passed away and many events have taken place, which have little or no historical importance. The study of these, is not the study of history in the proper sense. History seeks those facts which mark progress. A people which has contributed something to the progress of mankind, we properly regard as a historical people. The Greeks, for example, occupy a high place in the history of the world, because they have added much to the world's civilization, by which term we infer a certain degree of advancement in things that make up human life, which contribute to human welfare and human happiness. It is the purpose of this paper, then, to touch upon those points in the history of our organization which have been significant in the advancement of our calling from a state of empiricism to the position of a learned and respected profession.

In passing it may be of interest to consider briefly the conditions prevailing prior to our organization: The panic of 1837, brought on by Jackson's "Spoils System" and his policy relative to the United States Bank, made it difficult for many to earn a livelihood in their vocations, and the success of men who at that period had made for themselves reputations in dentistry, and who were generally supposed to have lucrative practices, induced many to take up dentistry. There was no legal restraint or safeguard at that time, and numerous incompetent and unqualified persons entered the practice regardless of proper preparation but ambitious for great financial returns.

This was, no doubt, an incentive for the founders of the early dental associations, to put dentistry on a higher plane, not only among the reputable practitioners, but with the laity as well.

The Mississippi Valley Association of Dental Surgeons had organized at Cincinnati in 1844, and at their organization meeting an Examining Committee was appointed to pass upon the qualifications of those desiring to become members; and it is interesting to note that many on these committees were men whose memories will live in the history of the profession.

The Northern Ohio Association, organized in Cleveland in 1857, likewise had a charter-membership list which indicated in unmistakable terms that dentistry was awakening from the lethargy of former years.

The Mad River Valley Society at Springfield in 1857 aroused professional pride in that section of our State; also the Central Ohio in Columbus in 1861, though born but to die the following year, owing to the crisis in our country, were evidences of smoldering enthusiasm which was to burst into flame at a more opportune time.

Four long years of strife and bloodshed followed. After the clouds had passed away, another Central Ohio Dental Society, which had its inception at White Sulphur Springs during the meeting of the National Dental Association, came into existence at Mansfield, September 5, 1865. In the meantime Michigan in 1856, Indiana in 1858, Iowa in 1863, Massachusetts and Connecticut in 1864, Illinois and Missouri in 1865, had perfected State organizations; and it was at the meeting of the Central Ohio Dental Society, in session at Mt. Vernon, May 21, 1866, that a resolution was presented by the late Dr. J. B. Beauman of Columbus, and adopted, that a committee be appointed to take such steps and adopt such measures as were necessary for the organization of a State Society. A committee was appointed, and as a result, the following call was issued May 21, 1866, signed by fifty-six dentists:

> "The entire dental profession of the State of Ohio is hereby cordially invited to meet in mass at a convention in the city of Columbus, Naughten's Hall, on Tuesday and Wednesday the 26th and 27th of June, 1866, to form a State Dental Society, and to devise and adopt such other measures as tend to elevate and advance the interests of the profession. Come up, brethren, and let us have such a meeting as our profession has not yet known! The advantages to be derived from such an organization cannot be overestimated. Other States are organized. Shall Ohio lag behind?"

Pursuant to this call, forty-one members of the profession assembled in conformity to the purpose stated. What a galaxy of names responded!

Many will forever be household names, not only in Ohio, but wherever dentistry is known, and I would ask your indulgence while the Secretary calls the roll of the charter members of this association:

ROLL CALL.

The Secretary:

G. W. Keely, Oxford
B. F. Robinson, Cleveland.
B. Strickland, Cleveland.
W. P. Horton, Cleveland.
C. R. Butler, Cleveland.
L. Buffett, Cleveland.
J. E. Robinson, Cleveland.
J. C. Stephan, Cleveland.
A. E. Lyman, Warren.
J. Taft, Cincinnati.
C. H. James, Cincinnati.
H. A. Smith, Cincinnati.
George Watt, Xenia.
N. W. Williams, Xenia.
A. A. Blount, Springfield.
B. A. Rose, Urbana,
A. W. Maxwell, Galion.
C. M. Kelsey, Mt. Vernon.
M. DeCamp, Mansfield.
C. H. Harroun, Toledo.
W. E. Dunn, Delaware.
S. D. Tuttle, Eaton.
H. Newington, Cincinnati.
J. F. Siddall, Oberlin.
J. B. Beauman, Columbus.
W. G. Drake, Mt. Sterling.
H. C. Howells, Hamilton.
F. H. Rehwinkel, Chillicothe.
A. R. Lord, Shelby.
J. M. Rhoades, Wooster.
Richard Corson, Middletown.
B. T. Spelman, Warren.
C. R. Taft, Cincinnati.
C. S. Cady, Delaware.
E. D. Lord, Bellevue.
J. W. Wortman, Columbus.
J. McKinley, Uhrichsville.
John Fowler, Columbus.
I. Williams, New Philadelphia.
E. Conway, Dayton.
T. W. French, Chillicothe.

The President: Why are there no responses?

"What greetings come there from the voiceless dead?
What salutation, welcome, or reply?
What pressure from the hands that lifeless lie?"

Response by Secretary:

"They are no longer here; they all are gone
Into the land of shadows,—all save (one) **three,*
Honor and reverence, and good repute
That follows faithful service as its fruit
Be unto (him) *them,* whom living, we salute."

President: (Audience standing.)

"——And what if thou withdraw
In silence from the living and no friend
Take note of thy departure? All that breathe
Will share thy destiny. The gay will laugh
When thou art gone, the solemn brood of care
Plod on, and each one, as before, will chase
His favorite phantom; yet all these shall leave
Their mirth and their employments, and shall come

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*Drs. W. P. Horton, C. H. Harroun and Alexander R. Lord are the only ones living of Charter membership list but are absent from this meeting.

And make their bed with thee. As the long train
Of ages glides away, the sons of men,
The youth in life's green spring, and he who goes
In the full strength of years, matron and maid,
And the sweet babe, and the gray headed man—
Shall, one by one, be gathered to thy side
By those who in their turn shall follow them."

When this organization meeting was called to order, Dr. B. Strickland, of Cleveland was appointed Chairman and Dr. H. A. Smith, of Cincinnati, Secretary pro tem. Drs. J. Taft, C. R. Butler and Geo. Watt were appointed Committee on Constitution and By-Laws. They reported a draft during the meeting, which, with very few modifications, was adopted. According to the Constitution, any one commencing practice after date of organization, should not be eligible to active membership in the society without a diploma from a Dental College.

The By-Laws provided for an annual meeting to be held the last Tuesday in December and a semi-annual meeting the last Tuesday in June. But one semi-annual meeting was held (June 18, 1867), and at the December (1867) meeting, an amendment was proposed that the annual meeting be held the first Tuesday in December, and the semi-annual meetings be discontinued. This amendment was carried at the December 1868 meeting.

A Committee on Nominations for permanent officers of the society reported the following, which, on ballot, were duly elected:

For President, Geo. Watt, of Xenia; First Vice-President, G. W. Keely, Oxford; Second Vice-President, B. F. Robinson, Cleveland; Secretary, H. A. Smith, Cincinnati; Cor. Secretary, A. W. Maxwell, Galion; Treasurer, M. DeCamp, Mansfield.

One thing was accomplished at this meeting that had never been attempted by any other dental organization, viz.—the drafting and adopting of a Code of Ethics, a copy of which is published in the Dental Register, Vol. XX, pages 343-345 (August 1866) and is commended to your thoughtful consideration.

The committee having the distinction of drafting the first instrument of this nature—(an instrument, by the way, which has set at rest forever a great many things that had been harassing and vexing in dental associations)—consisted of Drs. B. F. Robinson, M. DeCamp, G. W. Keely, J. Taft and George Watt. A review of the early records of this association, furnish many incidents of its rigorous enforcement among the membership.

As an evidence of the high professional ideals of the charter members of this organization, we quote the following Resolution which was unanimously adopted:

> "Resolved- that we, the members of the Ohio Dental Society, pledge ourselves to sustain the Ohio Dental College, deeming it a duty we owe the profession, that its honor may be sustained, and that true dental science may be advanced; and we further Resolve that, if need be, we will give our money to sustain said institution."

Considerable discussion took place during this meeting relative to ways and means of securing the passage of an act to regulate the practice of dentistry in this State. Resolutions were passed constituting each member a committee of one to present to the laity the importance of the passage of the bill; that copies of the bill be sent to each member of the profession, soliciting co-operation in circulating petitions to be promptly returned to Dr. Taft, Chairman of the Committee. This being the first bill to regulate the practice of dentistry in the State, may reasonably account for the modesty of its requirements, to-wit:

> "It shall be unlawful for anyone to practice dentistry in the State of Ohio for compensation, unless such person has received a diploma from the faculty of a dental college, duly incorporated under the laws of this or any other State of the United States, or foreign country, or a Certificate of Qualification issued by the State Dental Society, or by any local society auxiliary thereto,—provided that nothing in this section shall apply to persons now engaged in the practice of dentistry in this State before the first day of January, 1873."

This bill was passed May 8, 1868, making Ohio the third State to secure dental legislation, and was in force until the passage of the second dental law, May 8, 1892, twenty-four years to the day.

The aspect of the rubber patents was fully discussed, but by request these discussions were not reported for publication. Dr. Beauman offered a resolution which resulted in the appointment of a committee to investigate the validity of the patent in vulcanizing rubber, as used for dental purposes.

Dental education also came in for a full share of discussion, and the following resolution was adopted:

> "That no member of the Ohio State Dental Society shall take any man as a student who is not known to be of good moral character and possessed of a good education, or for a less term of pupilage than two years, and agrees to take a regular course of lectures in some dental college."

A descriptive clinic by Dr. Harroun on "Method of Taking Impressions in Cases of Cleft Palate" and a paper by Dr. Siddall "Ten Years in the Practice of Dentistry" made up the literary part of the program.

A review of the proceedings of this organization-meeting shows that precedents were then established, which have given a tremendous impulse toward those higher standards which have continually been the goal of the organization. It was the dawn of a new, and of a brighter era for dentistry in Ohio. Character and qualification were to be made necessary assets; increased efficiency would naturally follow and a higher regard and appreciation of the profession awakened in the public mind. It marked the end of previous sporadic attempts to unite the profession as a whole, and happily such ending was as the morning ends when it merges into the fuller light of the day.

The Goodyear Rubber Company had become the legal owners of letters patent for an improvement in artificial gums and palates, and issued to dentists for various sums, licenses and agreements to use its process only in their own business. The contest as to the validity of the patent was long and bitter. A special meeting of the Society was called at Columbus, November 1, 1866, at which the association resolved itself into a committee of the whole, with the President as Chairman, in reference to questions involved in and arising out of claims of said company. Contributions of $10.00 were asked for, to meet the present emergency, and a liberal response followed. The following resolution was agreed to:

> "To decline to accede to the demands of the Goodyear Dental Vulcanite Company."

This action was heartily endorsed by kindred organizations throughout this and many other States. As further evidence of the determined stand of this association, at the second annual meeting in 1867, a resolution was passed to raise $800.00 to relieve Dr. I. J. Wetherbee, of Boston, Mass., of the financial burden in his attempt "to resist the unjust and extortionate demands of the Goodyear Company." I mention this as evidence of the magnanimity of the founders of this society, and as an incentive for the furtherance of that spirit in the society of today touching on patented dental processes, which has been voiced in the slogan—"Millions for defense, and not a cent for tribute."

An interesting case in facial prosthesis was presented at this meeting in 1867, by Dr. W. M. Herriott, in which an artificial nose, upper lip and nearly all of the superior teeth had been supplied.

That this organization was to be paramount, and occupy a distinctive position in the drama of dental events in Ohio, is evidenced by a called meeting of the society to be held in Columbus, May 20, 1868, "for the purpose of consulting and adopting such measures as may be deemed best for the execution of the law recently enacted" (May 8). Seventeen members responded and the privilege of the floor was extended to those present not members. Measures were taken to obtain the names of all practitioners in the State; resolutions were adopted empowering a committee of five to select an Examining Board to consist of five members; that they were to be allowed ten dollars per day and expenses, and the examination fee to be twenty-five dollars. The personnel of the first Board was as follows: Drs. J. Taft of Cincinnati and F. H. Rehwinkel of Chillicothe, for three years; M. DeCamp of Mansfield and W. P. Horton of Cleveland, for two years; C. H. Harroun of Toledo, for one year. That it was a position in which the members were imbued with an altruistic spirit, we find, when the Board at the State Society meeting in 1875, voted to donate the fees and expenses of each member for that meeting, aggregating $162.00. The society was responsible for the faithful execution of the law, and its wisdom seems to have been well exercised in the selection of its Board members, inasmuch as during the twenty-four years under this regime, but nine individuals served as members.

Considering the prestige and efficiency of this association in State Board matters during this period, from '68 to '92, and with a high appreciation of the ability and proficiency of the appointees since that time, it is difficult to suppress the opinion that the indifference of our present and past Chief Executives of Ohio, relative to endorsees of this society for membership on said Board, is a travesty on our present representative organization.

This organization has been a potent factor in influencing the trend of dental progress in the Middle West, but a paper of this nature will not permit even mention of many events that may be considered land-marks in this advancement.

During the early years of its history it enjoyed a steady course; but the discouragements which assailed it, added persistence to the master minds which were to shape its destiny.

In the Treasurer's report in 1882 the statement appeared that of the forty-one charter members, but fifteen were on the roll as active members; that two hundred and seventeen members had been enrolled, but the present active membership numbered one hundred and eighteen. With this membership it is reasonable to suppose that a unanimity of opinion should prevail, relative to measures for the general welfare of the profession and the public. The converse, however, was true, and a disturbing element sought to bring contempt and opprobrium upon the society. At the close of the annual meeting in 1884, the society adjourned sine die, for the purpose of eliminating the disturbing faction, and the restoration of harmony. On the evening following the adjournment, eighteen loyal members met for the purpose of reorganizing, and by following a "Pride's Purge" policy, obnoxious members of the old organization were to be refused admission. Thus the society was given new birth, and adjourned to meet in Chillicothe the first Wednesday in October 1885, the first meeting out of Columbus since the organization in 1866.

In order to stimulate interest and increase prestige in various sections of the State, meetings were held in Toledo, Springfield, Cincinnati and Cleveland respectively, when in 1890 the society again met in Columbus, meeting there continuously thereafter, until the present, excepting the meetings at Cincinnati and Toledo in 1912 and 1913 respectively.

Since the reorganization in 1884, the society has not had a ripple of internal dissension. There may have been contentions but these speak well for the strong individuality of the membership.

Our annual meetings always have aimed to bring to us the latest and best throughout the whole field of dentistry.

Since the adoption of our present component system, our growth has been phenomenal; instead of some 250 members in 1907, we are an organization of 28 component societies, with a total membership of almost 1500 men. What a power for the promotion of social and educational growth! We are in close touch with the professional pulse in any quarter of the State, and where interest lags, there the State Society sends its message of encouragement and stimulation.

The foundation has been laid for our society of the future. Let us reinforce this foundation, by strengthening these component societies, that they may be permanent organizations in their respective districts; this will enable us to more fully meet our responsibilities, which are becoming extended as the relation of dentistry to the public health becomes more widely known.

We are nearing the dawn of a new period, whose refulgent rays bespeak for our profession possibilities even greater and grander than would the rich harvest of the past years have seemed to the founders of this society on this Golden Anniversary.

I shall not have discharged the duties enjoined upon me by our By-Laws, until I shall have called your attention to our present status and matters that seem of imminent importance to our professional interests and progress, and to the welfare of the public, which should be one of the purposes of this and all kindred associations.

Within the last decade many innovations have been introduced in dental practice; many of our most skillful operators have hailed these methods with enthusiasm, and many of equal ability have as severely condemned them and returned to more primitive methods. It is a period of confusion, in that it is most difficult to determine just what is the proper procedure in practically all of our operations. This is not only true in dentistry, it is equally true in medicine, politics, religion, all labor questions, and I might include the great war now raging in Europe. People cannot settle upon a definite line of action, nor determine what is best to do, or even think. However,. this does not necessarily indicate an overthrow or abandonment of fixed and stable principles. It is, instead, a symptom of progress; for if everyone knew just what to think—what step it were best to take in any direction, then we would have, not advancement, but stagnation! It is, then, a sign for us as individuals, as an organization—of Progress! And it is a time for each of us to be constantly in touch with men and movements—to be alert—to grasp the truth as it may come—and always to learn. This is really a great and wonderful age, our own, by reason of such splendid possibilities in it for all of us. For out of this seething of ideas, this unrest and confusion, we are coming from something old to something new, and from something not so good, to something better, inspiring us to higher and nobler purposes, better and truer living.

An impending danger which confronts the dental profession and which in our desire for real progress we must guard against, is the conferring of the degree of "dental nurse" by some of our educational institutions, as they are not required to register, or pass the examination by the State Board, and inasmuch as our dental law makes no provision for regulating the practice of a "dental nurse."

Connecticut is unfortunate in recognizing four grades of dental operators; the licensed, the registered, the licensed assistant dentist, and the dental hygienist, or dental nurse.

The licensed and registered are practically the same, the former obtaining his license by examination, the latter through registration by virtue of an Act in 1907. Licensed assistants were given that rating in 1907 to forestall an effort to license a number of laboratory men. A licensed assistant can do operative work, but only under the supervision of a licensed or registered dentist.

To circumvent the law, a "licensed assistant" would own a practice and protect himself by employing a licensed dentist, usually an unfortunate in the profession, and would himself operate without supervision. The State Board revoked the license of an "assistant," who instituted mandamus proceedings in the courts, to have his license restored. The court held that the license could not be taken away, as nowhere in the statutes of the State was authority given to revoke such a license. Later, however, the same man was haled before a criminal court and found guilty on three counts relating to professional work. He appealed to a higher court, where he pleaded guilty and paid his fine. The law was amended in 1915 to more specifically regulate the work of an "assistant."

As to dental hygienist, or dental nurse, any woman in the State may secure recognition as a dental nurse, provided she register with the State examiners and operate in the office of a licensed or registered dentist, or in any public or private institution, under the same general supervision.

A recent case before our own State Board involving the employment of a so-called "dental nurse" by a licensed dentist, for the purpose of cleaning teeth, is a case in point. Inasmuch as the court contended that it was for a jury to decide as to whether cleaning the teeth is a dental operation, and they decided in the negative, our dental law should be amended to specifically state what constitute dental operations; otherwise, abiding by the decision rendered in this case, cleaning teeth is not a dental operation and there is no restraint to anyone performing the operation, regardless of the deleterious results that unskilled technic may have on the adjacent tissues. Granting that a law was enacted permitting the operation to be performed by a "dental nurse"—an inspector would be necessary in many offices, otherwise this privilege would be abused.

In regard to the physical condition of our State Organization, the relations that have been established throughout our component societies are of the most cordial and fraternal nature; the same may be said of our relation to the various State Organizations, all of which have a community of interests, given expression in our National Dental Association.

During the year just closed, I have availed myself of several opportunities to visit many of the component societies and was indeed impressed by the dentists assembled, as being representative of the progress, intelligence and influence in their respective localities; and with the zeal, earnestness and business-like manner which characterized all of their meetings.

I suppose all presidents who have preceded me have been, and all who come after me will be asked for opinions relative to matters in which the societies themselves should exercise their prerogative. It is impossible to repress the wish that all officers and members would know that the President of the State Society has not dispensation power, and that he and the humblest dentist are alike exalted before our Constitution and By-Laws, and must alike revere and obey its mandates.

There is a precedent established by custom in this Society to endorse ten men, from which number the Chief Executive of the State is requested to make his selection for membership on the State Board. Numerous complaints from men eminently qualified to serve on said Board lead me to advise the discontinuance of this practice; first, because our association interests are served best by eliminating politics, and secondly it is a disparagement of the general intelligence of our membership to endorse that number out of a body of 1500 men.

The past year has been a fruitful one in procuring long-needed legislation, and our legislative committee is to be congratulated on the support it has received from similar committees throughout the component societies, and the Northern Ohio Dental Association. The unanimous sentiment of our profession has been to place the profession on a higher plane, by requiring all prospective practitioners in this State to present credentials as evidence of satisfactory preliminary education. In passing, it is proper to call your attention to the last report of the National Association of Dental Examiners, which contains the surprising item that the failures of graduates from the four Dental Colleges of Ohio ranged from 42.5 per cent. to 2.6 per cent. These examinations were taken before eight State Boards and the college having the smallest percentage of failures is an institution which insists upon preliminary educational requirements, as called for in our recent law. These facts should silence forever the question as to the importance of proper preparation before entering upon the study of dentistry. Modern dentistry is based upon scientific knowledge, and as the dental schools regulate the standards of the dental profession, it is up to the dental school that he receive such knowledge. Dental schools that are bona fide departments of State Universities, have supported all efforts in the direction of high preliminary requirements. Private and commercial interests should never be a menace to professional advancement, and we who desire for our calling, that it be more than a profession of partial culture, should individually, and as an association, place our stamp of disapproval on all institutions whose motives clog the wheels of professional progress.

More adequate legislation seems imperative, to prevent the great sacrifice of human teeth by itinerant physicians, who, under the guise of curing each and every systemic disturbance, resort to ruthless extraction. While the recent case in the city of Coshocton was lost, possibly by the manner of procedure, and the opinion of the Grand Jury basing the matter of indictment on their own opinion, rather than upon the law, that section of our law relative to physicians extracting teeth should be more specific.

Inasmuch as the relation of this society to the Ohio Health Federation is largely of a legislative nature, I would strongly recommend that the chairman of the Legislative Committee be the representative of this society on said Federation Board.

Many of the high class magazines have refused spurious advertisements, and I would recommend that this society pass resolutions condemning pernicious and misleading advertisements, and that said resolution be presented to the Ohio Newspapers Advertising Association.

The publication of a Historical Booklet, as a souvenir of this our Fiftieth Anniversary, is a matter which I trust will meet with your favorable consideration.

The publication of a Dental Directory of Ohio is also hereby recommended, after the plan adopted by the Illinois State Dental Society, whereby the cost of production is defrayed by the advertising matter therein.

Our society has in its archives, minute books which furnish valuable records of this society; during the past year, minute books of several discontinued and defunct societies have been sent in for preservation. The fireproof vaults of the new Historical and Archaeological building on the Ohio State University campus, are open to this society for the preservation of its records, and I would urge that the society make this a repository for its and any other records that may become its property, where they will always be available for reference.

There should be some recognition made of continuously long membership in this society; after a continuous membership of twenty-five years, a member should be exempt from payment of dues, providing, however, that his National Association dues be continued, and paid to the treasurer of his component society, the latter society to determine as to the continuance of his dues for their body.

Owing to our increasing membership, the importance of keeping the component societies in closer touch, and for the purpose of more concerted action relative to legislative and other important measures, the publishing of a Bulletin, seems of great importance. Many states have adopted this method of keeping their organization in close relationship and its necessity has been sorely felt in the work in Ohio, during the past year.

The American Miller Memorial has become a reality during the six years since its inception, and the thanks and appreciation of our society are due the various Honorary Committees on this Memorial, and through them our greetings to their respective societies. The unveiling of this Memorial will be one ot the distinct features of this meeting, and further reference to it at this time is unnecessary.

I desire to express my personal thanks, and trust our organization will pass a vote of thanks, to the National Art Publishing Company, of Fort Wayne, Indiana, for Volumes 1 and 2 of Koch's History of Dentistry; to the R. L. Polk Company, of Detroit for copy of Dental Directory for 1914; and to numerous others who have contributed interesting and valuable data that has been placed in a copper box, hermetically sealed and deposited in the base of the Memorial.

During the past year, our hearts have been saddened by the removal by death of several who in the past rendered loyalty to this association, and I recommend that suitable resolutions be drafted and spread upon our minutes and published in our official organ. Among these was Dr. Jonathan Hopper Kendall (born, Fruit Hill, Ohio, June 28, 1877, died, Columbus, Ohio, May 8, 1915) ex-president of the Columbus Dental Society, and a member of the Arrangement Committee for this meeting. Space will not permit paying a proper tribute to him, whose skill and enthusiasm for high professional ideals and pleasing personality endeared him so strongly to his confreres. Another was a charter member and ex-president of this association. I refer with tenderness and deep feeling to that rare and sterling character, that versatile genius—Charles R. Butler. I do not pause to summarize the biography or write the virtues of this distinguished man, and I should feel the poverty of language should I attempt to do so. Was there ever a man who did not love Dr. Butler, and feel an inspiration when in his presence?

At the passing of each friend we feel the breaking of another chain that binds us to this world, and the entwining of another cord that draws us to the world beyond.

In conclusion I desire to thank my associate officers and the membership generally for their kindness and helpfulness during the administration of the past year. I have striven to carry out the will of this body as a whole; my efforts for this association, as President, have passed, but I shall return to the ranks with just as great a desire to assist in the advancement of this organization as when an officer and assisting in directing its functions.

In our present position we stand as beneficiaries of the past, and trustees for the future. Let us endeavor by every effort, to enrich the bounties we have received, and leave to the members who shall follow us, a legacy for continued striving after Progress—ever further Progress.

SUPPLEMENT TO PRESIDENT'S ADDRESS

Those signing the call (under date of May 21, 1866 "to the dentists of Ohio") for the organization meeting, were:

C. N. Woodward, Ripley
J. Taft, Cincinnati.
A. Berry, Cincinnati.
H. R. Smith, Cincinnati.
Wardell & James, Cincinnati.
Cameron & Wright, Cincinnati.
H. A. Smith, Cincinnati.
C. R. Taft, Cincinnati.
S. W. Ludlow, Columbus.
John Fowler, Columbus.
J. W. Wortman, Columbus.
R. G. Warner, Columbus.
J. B. Beauman, Columbus.
S. R. Bequith, Kinsman.
F. S. Whitslar, Youngstown.
J. R. Finney, Youngstown.
J. C. Whinnery, Salem.
D. Herrick, Trumbull Co.
A. A. Blount, Springfield.
J. Armstrong, Bucyrus.
A. W. Maxwell, Galion.
Rhoades & Myers, Wooster.
C. R. Butler, Cleveland.
B. F. Robinson, Cleveland.
B. Strickland, Cleveland.
F. S. Slosson, Cleveland.

H. C. Fowler, Columbus.
W. R. Lilley, Circleville.
M. DeCamp, Mansfield.
N. W. Williams, Xenia.
Geo. L. Paine, Xenia.
George Watt, Xenia.
C. C. Carroll, Ravenna.
B. F. & D. Gibbons, Warren.
C. Palmer, Warren.
B. T. Spelman, Warren.
M. M. Oldham, Springfield.
D. Phillips, Springfield.
A. E. Lyman, Garrettsville.
L. Buffett, Cleveland.
Gibbs & Stout, Portsmouth.
H. H. Harrison, Cadiz.
J. W. Scott, Cadiz.
H. Morrison, Steubenville.
O. Kells, Steubenville.
W. C. Anderson, Steubenville.
J. Chesebrough, Toledo.
C. H. Harroun, Toledo.
B. F. Rosson, Troy.
C. Bradley, Dayton.
Thos. K. Brewster, Dayton.

The following is written on the copy of original call, in possession of Dr. F. R. Chapman, Secretary of State Society: "G. W. Keely regrets his name did not appear on above call but was on hand at the organization meeting and every meeting but one to this date, January 22, 1882."

Members of State Dental Board elected by State Dental Society:

Meeting:

May 20, 1868, 1st Board—J. Taft, F. H. Rehwinkel for 3 years; M. DeCamp, W. P. Horton for 2 years; C. H. Harroun for 1 year.

1869, H. T. Smith
1870, M. DeCamp and W. P. Horton
1871, J. Taft and F. H. Rehwinkel
1872, H. A. Smith
1873, W. P. Horton and Chas. R. Butler
1874, J. Taft and F. H. Rehwinkel
1875, H. A. Smith
1876, C. R. Butler and W. P. Horton
1877, J. Taft and F. H. Rehwinkel
1878, H. A. Smith
1879, C. H. Harroun and C. R. Butler
1880, J. Taft and F. H. Rehwinkel

Meeting:
1881, H. A. Smith
1882, C. R. Butler and I. Williams
1883, J. Taft and F. H. Rehwinkel
1884, H. A. Smith
1885, C. R. Butler and E. G. Betty
1886, J. Taft and F. H. Rehwinkel
1887, H. A. Smith
1888, C. R. Butler and E. G. Betty
1889, L. E. Custer and J. Taft
1890, H. A. Smith
1891, C. R. Butler and E. G. Betty

Ex-Presidents of The Ohio State Dental Society:

Date of Election		Residence at that time.	Date of those deceased.
June, 1866	George Watt	Xenia	February 16, 1893
January, 1867	George Watt	Cincinnati	February 16, 1893
December, 1867	Jonathan Taft	Cincinnati	October 16, 1903
December, 1868	William P. Horton	Cleveland	
December, 1869	Frederick H. Rehwinkel	Chillicothe	June 8, 1889
December, 1870	George W. Keely	Oxford	August 24, 1888
December, 1871	Byron T. Spelman.	Warren.	November 18, 1904
December, 1872	Lewis Buffett	Cleveland	January 27, 1901
December, 1873	Henry A. Smith.	Cincinnati.	September 10, 1913
December, 1874	Charles R. Butler	Cleveland	December 14, 1915
December, 1875	Calvin R. Taft	Cincinnati	June 15, 1889
December, 1876	Israel Williams.	New Philadelphia	August 13, 1887
December, 1877	John C. Whinnery.	Salem	October 3, 1896
December, 1878	David R. Jennings.	Cleveland	October 29, 1897
December, 1879	Frank A. Hunter	Cincinnati.	
December, 1880	Chester H. Harroun	Toledo	January 8, 1916
December, 1881	Allen F. Emminger	Columbus	
December, 1882	John W. Lyder.	Akron	December 23, 1910
November, 1883	Archibald Berry	Cincinnati	October 2, 1889
October, 1884	Charles H. James	Cincinnati	March 12, 1903

October, 1885	Frederick H. Rehwinkel.	Chillicothe.	June 8, 1889
October, 1886	Henry H. Harrison	Cadiz	December 17, 1915
October, 1887	Jere E. Robinson	Cleveland	July 13, 1907
October, 1888	Cyrus M. Wright	Cincinnati.	November 15, 1911
October, 1889	William H. Sedgwick	Granville.	October 24, 1895
October, 1890	Edward G. Betty	Cincinnati.	
December, 1891	John R. Callahan.	Cincinnati	
December, 1892	George H. Wilson	Cleveland	
December, 1893	Charles Welch	Wilmington	September 9, 1900
December, 1894	William H. Todd	Columbus	June 19, 1910
December, 1895	Henry Barnes	Cleveland	
December, 1896	Levitt E. Custer	Dayton	
December, 1897	Grant Molyneaux	Cincinnati	May 12, 1911
December, 1898	Louis P. Bethel	Kent.	
December, 1899	Lafayette L. Barber	Toledo	
December, 1900	Herbert F. Harvey	Cleveland	
December, 1901	Otto Arnold	Columbus	April 1, 1903
December, 1902	Jacob B. Beauman	Columbus	June 19, 1907
December, 1903	John F. Stephan	Cleveland	
December, 1904	Stewart D. Ruggles.	Portsmouth.	
December, 1905	Henry L. Ambler	Cleveland	
December, 1906	Homer C. Brown.	Columbus	
December, 1907	Charles I. Keely	Hamilton.	
December, 1908	Will H. Whitslar	Cleveland	
December, 1909	Mordecai H. Fletcher.	Cincinnati.	March 26, 1914
December, 1910	Albert O. Ross.	Columbus	
December, 1911	Charles R. Converse	Springfield	
December, 1912	Weston A. Price	Cleveland	
December, 1913	James K. Douglas	Sandusky	
December, 1914	Edward C. Mills	Columbus.	

Another Correction

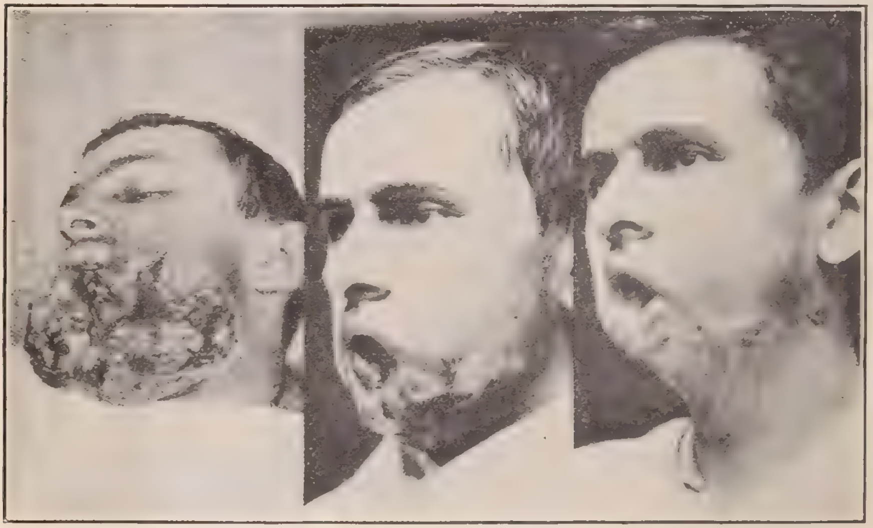
In the February issue of THE DENTAL SUMMARY under the heading, "Conservatism vs. Radicalism—A Correction," notice is given of the fact that Dr. W. W. Curtiss of Greenfield, Ohio, in an article of his read before The Ohio State Dental Society, at its 1914 meeting and published in the November 1915 issue of your magazine, had copied a large portion of an article of Dr. Alfred R. Starr without giving due credit. I desire to say that Dr. Curtiss has also seen fit to pay me a similar compliment. The portion of Dr. Curtiss' article beginning at the words, "O, Saint Apollonia" on page 879 and running through to the thirteenth line on page 883 is copied verbatim from an article of mine entitled, "Rationalism versus Empericism in the Selection of Dental Remedies" which was read before The Cincinnati Dental Society, December 30, 1910 and published in the *Dental Brief* for May 1911.

Sincerely,
W. H. O. McGEHEE,
Cincinnati, O.

SOME OF THE CASES DENTAL SURGEONS TREAT IN THE EUROPEAN WAR.*

BY SURGEON A. M. FAUNTLEROY, U. S. N., WASHINGTON, D. C.

“ONE OF THE MOST STRIKING FEATURES of the value of a dentist in the organization of a military hospital is shown in the results obtained by surgical cooperation with the dentists at the American ambulance in connection with the mutilating wounds of the face (figs. 145-159). These wounded always show compound fractures of the upper or lower jaw, with a variable amount of loss of substance. They represent a class of cases which extends over a period of months before a final operation is performed which completes the result. A wound of this character is considerably hampered at first with reference to the healing process on account of the secretions from the mouth and the necessary feeding of the patient. At the first operation these ragged and mutilating wounds are treated by the careful trimming away with scissors of the sloughing areas. In this procedure the vermillion border of the lip is preserved as much as possible, and then the tissues are loosely brought together with sutures and protected by a loose dressing, which has to be changed several times a day.



Figs. 145-147.—Operative stages shown in a series of three photographs of the same case

The preliminary steps of the operation consist of shaving the face and neck, scrubbing with green soap and water, followed by 70 per cent alcohol.

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*To give our readers something of an idea of some of the face and jaw wounds that the army dental surgeon, in the European war, has to treat, we copy this description from the "Report on the Medico-Military aspects of the European War" by Surgeon A. M. Fauntleroy, U. S. N., which has just been published.—*Editor*.

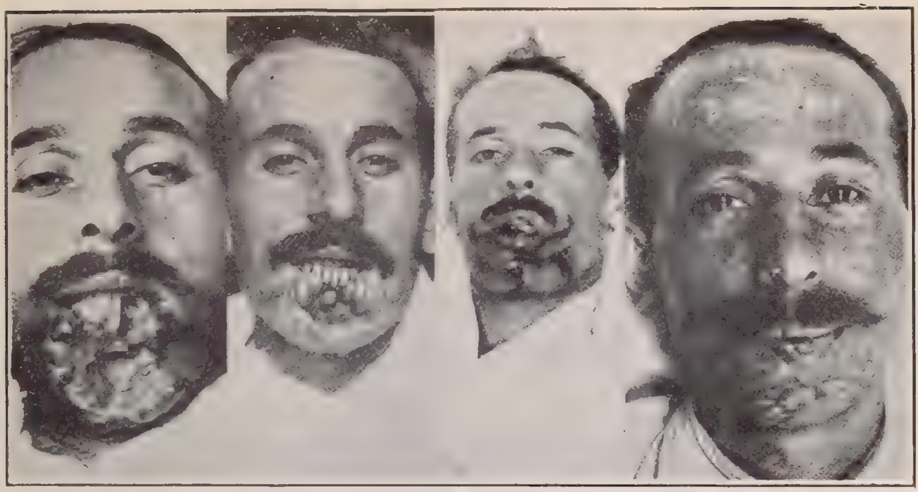
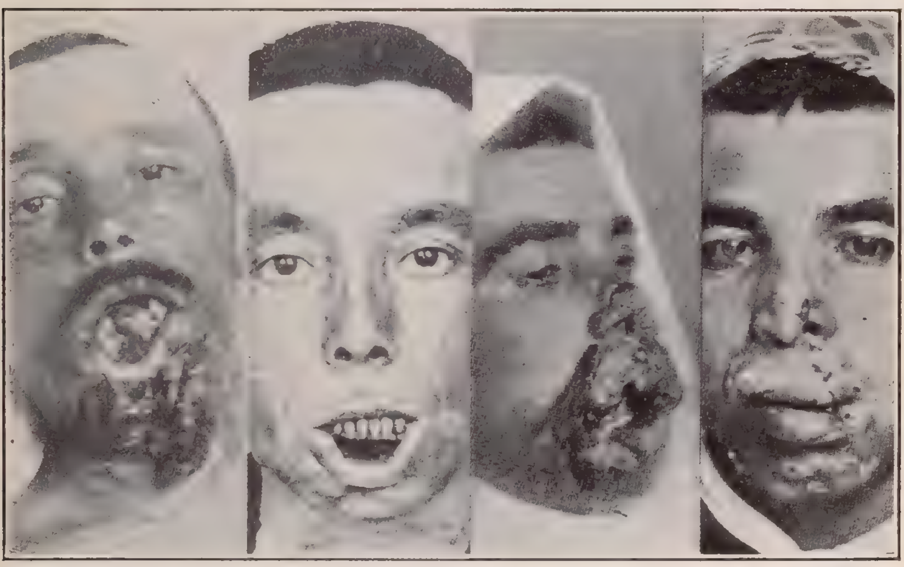


Fig. 148.—Original shell wound.

Fig. 149.—Result of partial healing and showing dental bridge.

Fig. 150.—Final plastic operation performed.

Fig. 151.—End result.

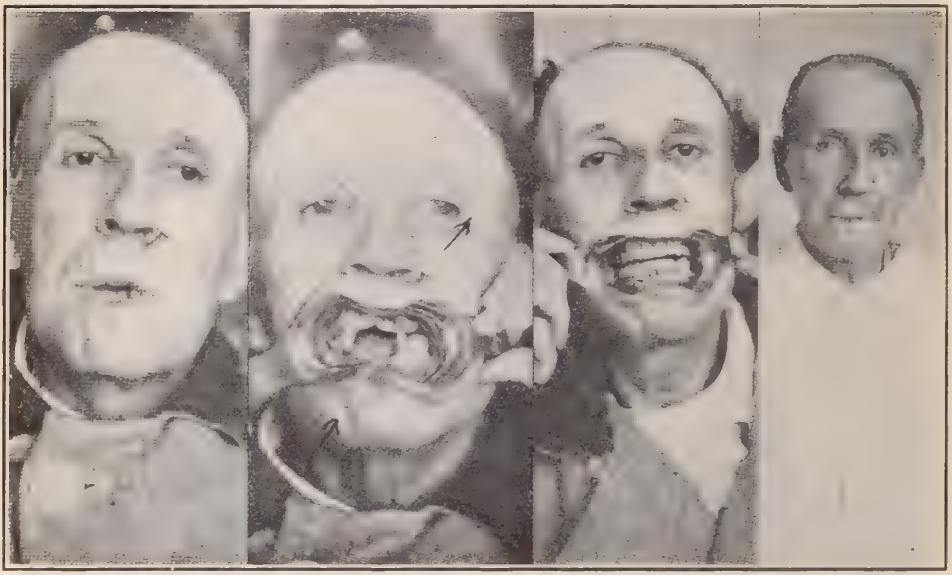


Figs. 152-153.—Showing original shell wound and the result of healing with the dental bridge in place.

Figs. 154-155. Shell wound of face, causing loss of front teeth with alveolar process, showing condition of patient (Arab) on admission and discharge.

As the mouth secretions are profuse and the bleeding rather free, it will be necessary to provide means for the prompt removal of this mixed fluid from the pharynx during the operation in order not only to prevent strangulation but also the inhalation of septic material which may cause pneumonia. This is best accomplished by a simple water-suction apparatus secured to a faucet in the operating room and having a long tube attached which ends in a good sized catheter. This later is held in the pharynx by an assistant during the operation, and the fluid is thus removed as it accumulates.

The most that is hoped for from the first operation is that the soft parts will unite in such a way as to admit of correcting any serious deformity later on by means of a final plastic operation. There are usually three stages in the general operative procedure. The first stage consists of bringing the soft parts loosely together, as indicated above. Usually there is so much loss of bony substance that no effort can be made at this time to unite the fractured ends of the bone.



Figs. 156-159.—Showing a series of photographs of a case admitted from another hospital which had no dental service. Original wound was due to a rifle ball which entered from below and resulted in a compound fracture of the lower and upper jaws. Showing condition on admission and discharge.

After the soft parts have united, the second or dental stage is begun. A metal bridge is anchored, by the dentist, on whatever teeth remain at the ends of the fragments. This bridge may be temporary at first for the purpose of simply holding the loose fragments in a steady position in the mouth. Gradually a scar will form over the ends of these fragments and the continuity of the mucous membrane of the mouth is slowly restored over the scar thus formed. The condition of the parts at this time is fairly satisfactory, although there may be considerable puckering as a result of the partial or complete healing of the original wound. Once the mucous membrane has grown over the scar between the bone fragments the third stage of the operation may be attempted. This consists, first, of a plastic procedure, which is directed toward as complete a restoration of the face as is compatible with the destructive effects of the original wound and the available skin in the immediate neighborhood of the scars. The second step consists in the removal of a portion of a rib, or of the tibia, which is then transplanted to complete the bony continuity of the jaw beneath the bridge.

In proceeding with the plastic operation on the skin, it may be necessary to partially remove the scar so as to bring about a better readjustment of the tissues. Injury to the newly formed mucous membrane must be carefully avoided, but if it is necessary to incise it, or if accidentally wounded, it must be carefully sutured. Having outlined the plastic work by the formation of suitable skin flaps, the ends of the bony fragments are carefully dissected free from the scar tissue so that no injury results to the underlying mucous membrane. The ends of these fragments are now freshened by either beveling or grooving. An accurate estimate is then made of the bone required to bridge the gap and a suitable piece of rib with periosteum may be resected, or a portion of the tibia with its periosteum may be removed, according to the preference of the operator.

There are several ways of securing the transplanted bone in place. It may be beveled and fitted into corresponding grooves at the ends of the fragments; it may be drilled and sutured in position with chromic gut; or, if the conditions are favorable, some form of bony inset may be attempted along the lines of a mortise and tenon joint. Having fixed the bone in place, the skin flaps are sutured and boric acid dusted over the suture lines. The after-treatment consists of careful liquid feeding and frequent mouth washing."

HISTORICAL SKETCHES AND A FEW ITEMS IN PRACTICE.*

BY J. G. TEMPLETON, A. M., D. D. S. PITTSBURGH, PA.

A FEW MONTHS AGO your secretary requested me to write a History of what I had seen or known of the dental profession, and also something of the city as it was more than half a century ago. To do this in a connected way and make it interesting in the reading, I find is quite difficult. The writer studied medicine previous to the Civil War and becoming familiar with the medical practice of those times, was impressed with the idea prevalent then among the medical fraternity that dentistry was only a mechanical business consisting chiefly of knowing "how to pull teeth," which in their estimation, as far as skill was concerned, was similar to drawing nails out of wood. They were unwilling at that time to give the dental profession credit for the discovery of the greatest boon the human race ever has known.

The last six decades of the world's history can truthfully be said to have been an era replete with discovery, invention and scientific progress of which the dental profession can justly claim a large share. Much of this is within the recollection of many here present.

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*Read before the Odontological Society of Western Pennsylvania, 1915.

In the year 1868, Dr. Mahlon Loomis, a dentist, then residing in Washington, D. C., conceived the idea of sending messages by electricity through the air without a wire. Previous to his death he succeeded in doing so. This you will appreciate was several years prior to Marconi's success in that line.

The writer remembers when there were no railroads in Western Pennsylvania. The first into the city of Pittsburgh was the Pennsylvania in the year 1851. The next was the Ohio & Pennsylvania which extended from Allegheny City, (now the North Side) to Crestline, Ohio. This road is now the eastern portion of the Pittsburgh, Fort Wayne & Chicago railroad.

When James K. Polk was elected President of the United States, in the year 1844, the telegraph had not been installed over the country, and it was three weeks before we knew whether Polk or Clay was elected. Four years later when Zachary Taylor was elected, the result was known throughout the Union on the morning after the election. During the sixth decade of the last century when the writer was studing medicine many things were veiled in obscurity that are now plainly visible. When we look back on those times regarding subjects medical and dental, we wonder as we stand in the lime-light of the present day that progress was so slow. Blood letting was common in medical practice. Laparatomy performed by McDowell of Kentucky without an anesthetic was the surgical wonder of the time. The patient's friends and neighbors gathered in a mob threatening with determination to kill the doctor in case the woman died, but fortunately the operation was a grand success and the operator, McDowell, has ever since been considered a hero, but we have not heard of any praise to memory of the woman who endured the capital and painful operation without an anesthetic. Anesthetics were introduced by the dental profession in 1844 when Horace Wells, dentist of Hartford, Conn., made the discovery, without which such important operations as prostatectomy, appendectomy and all laparatomies and capital operations of any kind could not be performed.

The writer came to Pittsburgh in the early autumn of the year 1862. The real fighting of the great rebellion began in May of that year. During the war this city was manufacturing large quantities of ammunition and all kinds of other materials needed in the army. The largest guns that had ever been made in the United States were made here at what was called the Fort Pitt works or foundry, located near Twelfth street between Penn avenue and the Allegheny river. The Girard hotel on the corner of Smithfield Street and Third avenue was taken and used by the Government as the headquarters of the provost guard. Martial music with soldiers marching on the streets were very familiar sights and not unexpected at any time. At night the policeman or watchman, as they were then known, called out the hour at every alley and street corner beginning at ten o'clock. They often called out regarding the weather, such as "Cloudy Morn" "Starry

Night" or "Raining like the D." The city was then undoubtedly deserving of the familiar cognomen "The Smoky City." There was an extensive use of illuminating gas at that time. There was no natural gas with its Welsbach diffusion of light and no electricity with incandescent bulbs. We think we can appreciate these improvements and we also are of the opinion that those still living who were here then, will appreciate them. We can remember of two days in Pittsburgh, so dark that people carried lanterns on the streets all day long.

During those times there were many educated and practically skillful men engaged in dental practice in the United States. Many of them gave up the general practice of medicine and devoted their time to dentistry as a specialty. It was a great pleasure to meet these men at the National Association or in their offices in different cities and learn their methods. Many methods and appliances invented then are still in use.

When the writer came to this city vulcanized rubber was not in general use for artificial dentures. The first vulcanizer he saw in this city was made of cast metal and looked very much like a small heating stove. The heating was done with bituminous coal. There were frequently a dozen or more plates vulcanized at one time. The first small copper vulcanizer was made by Dr. Roberts of New York City, who afterwards left the practice of dentistry and went into the oil business during its early history in Venango county, Pa. This man shortly afterwards invented the method of exploding nitroglycerine in the bottom of oil wells. The next small copper vulcanizer was made by Dr. Franklin of New York state. He gave with the sale of it, two lamps in which to burn alcohol under the vulcanizer. One lamp was smaller than the other and gauged in size so that when the alcohol was burned out of the small one the mercury in the thermometer would be at its required height. The other lamp kept the mercury at that height until the alcohol was consumed when the case was vulcanized. There were two small vulcanizers made in Buffalo, N. Y., one by Dr. Hays, the other by Dr. Whitney. The first vulcanizer that was my fortune to own was a Hays one, flask oven. The next was a Whitney which was purchased in December, 1872. This is still in good condition and ready for use. My debut in this city was prior to the general use of vulcanized plates. After its use became general, the dentists were compelled to pay a royalty for the Goodyear patent to a Company known as the Goodyear Dental Vulcanite Co. At the expiration of that patent they were compelled to pay for seven years longer on the Cummings patent which was for the application of rubber to dentistry. All of this is indelibly fixed in my memory for the reason that I had to pay over one thousand dollars under a force greater than that of a hydraulic press, viz: the United States patent laws. This money went into the treasury of said Company for the privilege of hardening or forming a new compound by heating a mixture of rubber and sulphur. The president of the Goodyear Dental Vulcanite Co. was Josiah Bacon, of Boston, Mass.

In the year 1866 The American Dental Association met in the city of Boston. Prior to that the Vulcanite Company had pressed its claims in some parts of the United States and had succeeded in getting a decision in its favor from the United States Supreme Court. The American Dental Association at its meeting at that time, appointed a Committee to confer with Bacon and make a proposition to him from the Association that they would purchase the patent for the benefit of the profession at large. Bacon appeared before the convention and told what the Company had done, and what it was their intention to do, ending with a blank smile, saying: "Gentlemen, we will take five millions from your profession" which was less than the amount the Company succeeded in getting from the dental profession of the United States.

Shortly before the expiration of the Cummings patent, Josiah Bacon went to California in the interest of the Company's claims, and got into quite an altercation with one of the dentists of that state, who shot him, inflicting a mortal wound in the abdomen, thus terminating the vital existence of that piece of bacon *on this mundane sphere.*

The profession felt very much relieved when the octopus-like grasp of the Goodyear, and Cummings patents was paralyzed by the limitation of the United States patent laws. Since that time patents have not been popular with those who obtain nutriment and enlargement of their bank account by repairing the natural and substituting the artificial in the oral cavities of such as possess the needful in sufficient quantities to tempt the mercenary one, whose whole object is a very plethoric purse, but the true professional dentist has a different aim.

The dental profession of the United States has an enviable history, but its continuing strength is in the members who work for tomorrow instead of today; who try to find new ways and better for performing what they are doing; constantly improving the methods they are using, and imbued with the spirit of altruism that has always characterized the true professional dentist. When I came to this city in 1862, prosthetic operations were not performed as they are now. Many silver plates were then used in the substitution of artificial dentures.

During the time the dentists had to pay for the use of the rubber patents they were anxious to get anything to take the place of vulcanite. At the meeting of the American Dental Association at Cincinnati in 1867, Dr. McClellan, of Louisville, Ky., exhibited a set of teeth on a material which he called Rose Pearl. He exhibited the same somewhat improved a year later at the meeting at Niagara Falls. Soon after the meeting, a Company in Albany, N. Y., obtained from McClellan his process on which they made some improvements, and sold it to the profession to use for artificial plates without any demand for royalty, calling it celluloid. This was used quite extensively the last few years the vulcanite patents were in force.

About the beginning of the year 1868 there was a material put on the market called Iodized Rubber which was used by a few in this city but did not prove satisfactory, however, the Rubber Company obtained control of it and it was not heard from again. There was another material recommended to take the place of vulcanite which was composed of shellac and earthy material. I have forgotten the name given to it, but it was derisively spoken of as "New Jersey mud," and its use lasted about as long as the existence of "Jonah's Gourd."

Fifty years ago the artificial dentures supplied by the dentists to their patrons were made by the dentists themselves or under their supervision and special direction in their own laboratories, but a short distance from their operating chair. The making of artificial substitutes to be of proper service and satisfaction requires a great deal more than mere mechanical knowledge and skill. It is an art which must be in possession of the dentist who sees what is required to reproduce the lost expression in the features of the face. This artist's ability to restore contour and outline of individual symmetry cannot be transferred to any laboratory prcsthetic man. During the time to which we refer the great majority of the artifical services that were rendered to the people represented more skill and time spent than very much of what is now furnished by those who patronize the prosthetic shops; because they are lacking in the will to do it themselves. During the times of which we speak what is now known as the S. S. White Co., was then under the sole control and management of Dr. S. S. White himself, and was supplying the profession with a better quality of artificial teeth with a much greater variety of shades with more natural appearance than anything of the kind on the market today.

Until quite recently the dental profession overflowed with a class of men whose preliminary attainments were deficient to a great extent in the erudition that enables a man to make rapid progress, yet many who were inefficient in education in the beginning of their professional career have by diligent and persistent effort acquired knowledge both theoretical and practical in matters pertaining to the profession of their choice, until they have ploded their slow but sure way up the hill of science, mounting at length, step by step, to eminence and distinction, becoming an honor to the profession and a blessing to their clientele. The work or labor of self improvement is an endless struggle upward towards the ideal and every advantage gained makes the way more clear towards greater heights.

In the early spring of 1865, the writer moved from this city to New Castle, Pa., where he lived for seven and a half years, during which time he was frequently back, but returning permanently in the autumn of 1872. While in New Castle he made many plates, porcelain teeth and plate baked together into one piece, also several of the porcelain enameled platinum plates known as continuous gum. During those times we bought platinum at fifty-two cents per dwt. The all-porcelain denture was first made by Dr. Mahlon Loomis who carved the teeth. This method was greatly improved by Dr. Samual Dunn of central Ohio, whose improvement consisted of moulded teeth biscuited, and then set with the porcelain body and all baked together into one piece.

Prosthetic dentistry is worthy of dentists' attention in laboratories of their own where they can have artistic designs carried out not only to their own satisfaction but to that of a discriminating clientele. When such practice prevails, we will have the halcyon day of dentistry, as far as artificial dentures are concerned, when full or half sets will be inserted to correspond or be in harmony with the temperament of the individual, when the human face divine will not be disfigured with pearly white bits of porcelain appearing to extend around from one ear to the other. You, as experts in your own lines know how to value the opinion or work of experts in other lines, and when you go outside your own field, you should rely upon and respect the knowledge and experience of experts in other fields. We need not refer to the great inventions and wonderful discoveries of the immediate or ancient past.

The lucifer match was wonderful to those who lived when it was first brought into use. In time the automobile and the air craft will be as familiar as the lucifer match is now. We no longer use the "old one hoss shay," nor are we traveling in the old stage coach because they are relics of a past age. We are living in an age of progress which is not in one thing or for one man alone or set of men, but for all humanity. We no longer use the old style method of condensing gold in the cavities of teeth to arrest the progress of decay. Thanks to Dr. Robert Arthur of Baltimore who first made known the advantage of utilizing the adhesive property of gold foil which had-been annoying the gold beaters for many years, to get rid of which they were very anxious. When I came to this city in 1862, Dr. Chas. Sill was the only dentist here using the adhesive gold foil in his practice. This statement can be corroborated by our mutual friend Dr. Lee S. Smith, who was at that time a student in Dr. Sill's office, and who is now one of the principal dental supply men of the United States. It now gives me pleasure to see his stock of goods grown from the small beginning in a drug store on corner of Fourth avenue and Market street.

The growth of this business is due to the foresight and executive ability of the senior member of the firm who was one of my first and most esteemed acquaintances in this city. The writer will further say that he has visited the principal dental supply houses in the United States and in his humble opinion the profession in Pittsburgh has the advantage of what is not second in that line to any other house in this country.

About the year 1864 the use of mallet force for the better condensing or welding gold in filling teeth was introduced by Dr. Wm. H. Atkinson of New York City who obtained his ideas of that force from a shoemaker in Meadville, Pa. This shoemaker also filled teeth with gold, having his wife use the shoemaker's hammer for a mallet to condense the gold.

About forty four years ago Dr. A. B. Robbins designed a steel mallet each end of which is a fac-simile of the pole end of the shoemaker's hammer. The rubber dam for keeping cavities dry was first used and introduced to the profession by Dr. Barnum of New York in the early part of 1866. He illustrated his method at the meeting of the American Dental Association at Cincinnati, Ohio, in 1867, where it was my pleasure to be and get a position beside the chair where I saw his method of application, a method I have used in my practice ever since.

The first automatic mallet was made by Dr. Salmon, of Boston, who also devised a dental chair which was popular until Dr. Wilkerson brought out a chair with the hydraulic device for raising the whole chair. Dr. Gaylord, of Connecticut devised a pneumatic mallet. Dr. Courtlen King of this city made a mallet in 1876 that gave the force on the gold without making pressure against the tooth. Both the King and Gaylord mallets have the same advantage in that they give the force on the gold which in our opinion is one very important thing in the action of an automatic mallet. The writer was the first to use the automatic instrument for condensing gold which was designed and made by my friend Dr. Courtlen King of this city, who died in 1895. There are many things that come to my mind relative to that department of our profession known as the operative, but time compels brevity. However, we will mention three more things in conncetion with our practice in which you will please permit the writer to say that he has had a somewhat extensive experience. Those three are Pyorrhea Alveolaris, Residual Abscess, and Edentulous Neuralgia.

The term pyorrhea alveolaris was first used by Dr. Rhewinkel, dentist, of Chillicothe, Ohio. The writer began treating the phagedenic condition of the gingival margin of the gums, causes, etc. in the year 1866 which was before Riggs wrote on the subject. For a long time my treatment was experimental, knowing that all deposits of any kind acting as irritating cause must be removed. We applied all the astringents and slight caustics we could think of to get the gums in a healthy condition, and the best results obtained were with aromatic sulphuric acid until one day we happened to think of what we had seen used in the Pennsylvania Hospital in Philadelphia for the cure of indolent ulcers which was Cupri. Sulph. from which we obtained the best results. This has been my treatment ever since. The vaccines are only adjuvants if they are of any use whatever.

After my long experience with pyorrhea and phagedenic gum margins, it seems to me that the use of vaccines without local operation with instruments suitable for removing all calcific deposits is like trying to wet a duck by pouring a few drops of water on its back.

In reference to residual abscess, will merely say that it results from the retention of one or more cells of septic matter in the healing of the opening made in the discharge of pus; the septic cells so retained will proliferate like the yeast plant, hence a residual abscess. *Moral*—Never let the opening from an abscess heal up too fast or too soon.

Edentulous neuralgia has its location in the alveolar region after the extraction of the teeth, and may be said to be analagous to a neuroma in the soft parts or tissue as occurs after the amputation of a limb. In the extraction of teeth, the nerve that enters the apex of the root usually breaks off at the apex, but sometimes it will be broken within the root. Then from an eighth to a quarter of an inch of that nerve remains in the socket, which is caught in the osseous matter deposited there during the absorption of the alveolar process after extraction. The diagnosis may be known by sudden, severe paroxysms of pain that medication will not reach. The only treatment is to cut through the gum and periosteum and raise periosteum from each side of the process, and extirpate that portion of bone impinging on the nerve.

Dr. James S. King who died a little over two years ago at the age of ninety-two years, was a man deserving of more than a passing notice, a man of more than ordinary ability in professional skill and knowledge. He was one of the first graduates of the Ohio Dental College and for many years was the only Dental College Alumnus in this city. To him belongs the credit of discovering the best and most successful method of capping exposed pulps that has proved out in practice. There were seven brothers in the King family, six of whom were dentists. Dr. J. S. the eldest was preceptor to each of his brothers. W. H. King graduated from the Ohio Dental College in same class with Prof. Taft. Dr. Calvin King was in the same office in this city for over sixty years. Dr. Courtlen King, who made the mallet, was an alumnus of Washington College, Pa., and also of the Pennsylvania College of Dental Surgery. Dr. Milton King, the only one of the brothers now living, has been practicing in this city over four decades. He and Drs. H. W. Arthur, Swensel and Biddle are the only ones practicing here now that were in practice in this city forty-three years ago.

Until quite recently the general practitioner took no interest in the condition of the mouth, jaws and teeth, until he was called to remove an aching molar. With the advance in our knowledge as a profession and our ever increasing information scientifically as to the way bacteria get into the tissues of the body, in many cases we have found septic foci about the teeth in the form of pyorrhea alveolaris and frequently in the tonsils. From these centers the blood and lymph are infected, carrying micro-organisms to other parts of the system which may induce arthritis or bladder and kidney troubles. The presence of pus about the roots of teeth has resulted in prolonged illness with manifestation of blood poisoning, also the swallowing of germ laden saliva. Foods so contaminated result in catarrh of the stomach or other inflammatory changes. Hence the dental profession is now to be congratulated that their scientific progress and advancement along these lines to which we have referred has induced the leading practitioners to take into consideration the condition of the oral cavity and also advise dental services.

Frequently they themselves seek information from the dentist in regard to treatment. Detersive therapy, etc. and are also willing to meet dentists in consultation because they have found that many dentists have as much medical knowledge as they have and are learned also in odontology as a science.

304 South Grace Street

THE ORAL PROPHYLAXIS TREATMENT VS. "CLEANING TEETH.*

BY GILLETTE HAYDEN, D.D.S., COLUMBUS, OHIO.

SINCE 1898 Dr. D. D. Smith of Philadelphia, to whom must be given the credit of bringing before the profession the oral prophylaxis treatment, has been writing papers, and giving public and private clinics and demonstrations upon this subject. His published descriptions, as well as numerous articles by his many followers, are so familiar that, even those who have not had the opportunity of seeing clinical demonstrations, must feel acquainted by now with the principles involved and the methods employed in the oral prophylaxis treatment. Therefore you will appreciate my hesitancy in offering to you a paper upon the subject.

Prophylaxis, oral prophylaxis, and oral prophylaxis treatment, are three terms, which though so frequently used interchangeably, carry an individual and distinct meaning.

"Prophylaxis may be defined as a preventive treatment for disease, especially for a particular form of disease in an individual."[1]

"Oral prophylaxis may be defined as a term applied to any procedure designed to prevent diseased conditions of the teeth and periodontal tissues. Such procedure may be instructive, orthodontic, surgical, mechanical or medicinal." This definition is offered by the committee on nomenclature of the American Academy of Oral Prophylaxis and Periodontology. "Oral prophylaxis should include the treatment employed, mostly by the dentist, to prevent particular diseases in the mouth of individual patients. There should be recognized a danger of, or a tendency toward, a certain disease in the mouth of the individual, and the measurestaken to prevent it constitute the practice of oral prophylaxis."[1]

Oral prophylaxis treatment is the term applied to a systematized, manipulative treatment of the mouth and teeth employed at stated intervals by the dentist as an aid in the prevention of disease and in the maintenance of the health of the teeth and periodontal tissues. As defined by its authors Dr. D. D. Smith, "the oral prophylaxis treatment is an art or surgical treatment of the mouth and teeth involving manipulative effort as distinguished from the administration of a systemic medicament or a therapeutic remedy."[2]

Thus prophylaxis is the general term applied to treatment for the prevention of any disease; oral prophylaxis is the term applied to any treatment for the prevention of disease in the mouth, and oral prophylaxis treatment is the term applied to a particular manipulative treatment employed at stated intervals by the dentist for the prevention of disease and the maintenance of the health of the teeth and their investing tissues.

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*Read before the Ohio State Dental Society, Columbus, Ohio, December 1915.

(1) Black. "Special Pathology." p. 411.

(2) D. D. Smith. "Six Years' Work in Oral Prophylaxis." Reprint p. 2.

The oral prophylaxis treatment as "instituted and recommended" by Dr. Smith, "has for its aim and object, not only freeing the oral cavity from conditions that cause tooth decay, but it has as a higher object, the eradication of infection from the mouth, the conservation of human health and the prolongation of life."[3]

In describing the technic of oral prophylaxis treatment in detail the same author states that "it consists of most careful and complete removal of all concretions, calcic deposits, semisolids, bacterial placques and inspissated secretions and excretions which gather on the surfaces of the teeth, between them and at the gum margins. This operation should be followed by thorough polishing of all tooth surfaces by hand methods (power polishers should never be used), not alone the more exposed labial and buccal surfaces, but the lingual, palatal and proximal surfaces as well, using for this purpose orange wood points in suitable holders, charged with finely ground pumice stone as a polishing material."[4] To this the use of a disclosing solution, (Talbot and Skinner), ribbon floss and finer grades of polishing materials have been added by various periodontists.

It is not the single, isolated treatment, but the persistent treatment given at definite intervals which constitutes the oral prophylaxis treatment. If we clean the teeth and mouth of a patient once, or give such a treatment occasionally we are practicing oral prophylaxis because we are employing a preventive measure, but that patient is not receiving the oral prophylaxis treatment. It should be distinctly understood that it is the systematized, manipulative treatment of the mouth and teeth given at *frequent* intervals which constitutes the oral prophylaxis treatment.

It is very obvious that, from the standpoint of the periodontist, each patient should have not only the privilege of profiting by the oral prophylaxis treatment but should also have the opportunity to benefit by such adequate instructive, surgical, orthodontic, mechanical, or medicinal procedure as the case demands.

All patients must be instructed in the proper use of the required brushes, floss and dentrifice in order that there may be that intelligent cooperation with the dentist so necessary for the attainment of successful results. There is practically a universal need for such instruction and it is imperative that the dentist meet this need.

It is impossible to obtain satisfactory results from the oral prophylaxis treatment for patients whose mouths contain inadequate mechanical dentistry. Fillings with contours unrestored, margins overhanging, contact points either lacking or misplaced, and occlusal surfaces absolutely minus any resemblance to those of the original teeth, unhygienic bridges, shapeless, ill-fitting crowns, and improperly filled root canals, are as inimical to mouth health as are the accumulations of debris upon and about the teeth. Therefore it is vitally important that all surgical and operative treatment of the

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(3) D. D. Smith. Dental Brief, June 1911. p. 412.

(4) D. D. Smith. Dental Brief, June 1911. p. 413.

mouth and teeth should fulfill the requirements of oral prophylaxis i. e. all treatment of the mouth and teeth should be carried out with the definite aim of preventing future destruction of tissue.

To restore and maintain the normal vitality of the tissues of the mouth, which condition alone renders the oral cavity resistant to disease, is the mission of oral prophylaxis and the oral prophylaxis treatment combined.

Almost all dental operative procedures are made necessary by the presence in the mouth of bacteria-infected, fermenting, putrifying and calcic debris. Such conditions as tooth decay, death of dental pulp, destruction of the investing tissues of the teeth and the loss of the teeth themselves all can and do come about through unclean mouth conditions. "When we realize the nature and cause of all these diseased conditions, and when a system of preventing them" in a large measure "is at our hands, the neglect seems criminal."[5]

Cleaning teeth as a treatment has been so degraded by dental practice that it has come to be, in the majority of cases, not what the term implies it is but a counterfeit of what it should be.

At present cleaning teeth is the term applied to a dental procedure intended to remove the *visible* deposits from the teeth for the purpose of improving their appearance. Hence cleaning teeth as ordinarily practiced is a procedure carried out primarily to produce aesthetic results.

It is a discredit to our profession that this term can be so defined. A procedure so important and so necessary demands more from the dental profession than is included in this definition of it. Genuine cleaning of the teeth is a real art and worthy of the best effort it is possible to put forth. It is not a menial service to be rendered grudgingly and imperfectly.

The technic of the usual tooth cleaning process is too familiar to require explanation. It is sufficient to state that the labial surfaces of the teeth receive the first attention, the buccal next, the lingual and occlusal sometimes receive care and the proximal receive no attention at all. In carrying out the process of cleaning the teeth in the majority of instances there is little if any consideration given to the supporting structures of the teeth and the injuries inflicted upon the gum margins through a lack of appreciation for the necessity of their preservation are inevitably frequent and destructive. Practically no instructions are given to the patient for the daily care of the mouth other than sometimes to recommend a dentifrice and mouth wash when the patient inquires. It is seldom that a patient receives even this inferior attention without requesting that the teeth be cleaned.

Naturally the individuality of each dentist tempers the quality and accuracy of his work in this as well as in all other dental procedures. The personal equation is the greatest factor of all and there are some at whose hands a cleaning of the teeth is the skillful and conscientiously rendered treatment it should be.

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(5) Adair. "Practical Oral Hygiene, Prophylaxis and Pyorrhea Alveolaris." p. 196.

The advantges of the oral prophylaxis treatment over the usual process of cleaning teeth are:

First: The treatment given is definitely aimed at the elimination from the mouth of all debris.

Second: The tooth surfaces are rendered smooth so that debris will not adhere so readily to them, and the patient therefore can more accurately care for the mouth and teeth.

Third: The patient is stimulated to give better attention to the mouth and teeth because of the frequent treatment at the hands of the dentist.

Fourth: If any cavity development occurs, or any dental operation becomes faulty, or any adverse condition of the mouth developes the dentist has an opportunity to discover such a condition in its early stages.

Fifth: The teeth and their investing tissues are maintained in such a state of health that their resistance to disease will be normally high. Thus to a great degree decay of the teeth and loss of their investing tissues through disease are prevented, as are also those systemic diseases which result from mouth infection.

A SAND STERILIZER.*

BY C. S. STARKWEATHER, D.D.S. BELLAIRE, OHIO.

PROCURE FROM YOUR DEALER six ground-glass-cover office preparation bottles, No. 6 size, S. S. W., holding half ounce each. Three of these should be of one color and three of another. Fill all of them two-thirds full with sand; any clean sand will do. I use glass-house sand. Fill three of these bottles with full strength formalin liquid. Three others fill with alcohol. Understand that all the bottles are two-thirds full of sand and *full* of their respective liquids.

Place two of these, one with formalin, one with alcohol, upon your bracket or cabinet, or as I do, in one of the small drawers of a bracket table. You cannot imagine a better or more rapid way of cleaning small instruments, scalers, broaches, burs, etc.

You plunge the instrument into the formalin and sand, giving it a rotary movement; then plunge into the alcohol and sand which removes all traces of the formaldehyde from the instrument. All infectious material, blood, pus, and what not that you remove from a cavity or pyorrhea pocket are removed from your instrument, and it is clean ready for another load of bacteria to be deposited in the sand.

By using six of these bottles you have a fresh one for each patient if you wish, and it is safe to do so. A drop of some mild perfume may be placed in the alcohol if you wish.

The cut will give you an idea of the bottle.

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*Clinic, Ohio State Dental Society, 1915.

EDITORIAL

Dental Surgery in the War

The present European war is showing the helpfulness of dental surgeons in the hospitals and proving them to be a more important factor than heretofore supposed.

In a recent report on the Medico-Military Aspects of the European War, by Surgeon A. M. Fauntleroy, U. S. Navy, the author refers to the commendable work that the dental surgeons are doing in the hospitals and speaks particularly of that in the dental department of the American ambulance. Among other things he says: “One of the surgical advances of the present war has been the recognition of the dentist as a necessary unit in the organization of a military hospital. This has been largely brought about by the present day trench warfare. The latter leads to a production of a large number of face and jaw wounds, involving usually a great loss of substance, in the form of bone, teeth and soft parts.”

“So valuable has this work become that every large military hospital now has its surgical dental department, which works in conjunction with the other surgical services and supplements certain procedures which are indispensable as regards bringing about a favorable result.

The surgical dental department of the American ambulance, under the charge of two American dentists, Dr. Hayes and Dr. Davenport, has greatly extended its usefulness during the present year. Starting with a small equipment and one assistant, three chairs in all, it has grown to six assistants and a proportionate number of chairs and equipment.”

“This department not only takes care of the dental cases at the American ambulance, but has treated large numbers of patients from other hospitals. A prominent part of the work has been the systematic inspection of the mouths of all patients admitted to the ambulance. This has involved a great deal of painstaking work, resulting in putting the mouths of many hundreds of patients in a healthful and comfortable condition. Many hundreds of treatments, fillings, and repair work of all kinds have been carried out, and as a result a large percentage of the patients show a general improvement of such a character as to be attributable to the dental work alone.”

“In order to give some idea of the amount of work performed by the dental department of the American ambulance, and also to indicate the importance of a dental department in the organization of a military hospital, the following summary is made from the report of the chief dental surgeon, Dr. G. B. Hayes, covering the period from September 6, 1914 to September 1, 1915 which is practically one year of surgical dental work:

Extractions, 2,658. Amalgams, 1,345. Cements, 627. Gutta-percha, 247. Arsenic, 192. Roots filled, 399. Nerves removed, 181. Wire splints, 6. Rubber splints, 14. Metal splints, 88. Bridge splints, 11.

Gold Splints, 1. Obturators, 2. Angle arches, 4. Pivots, 10. Plates repaired. 9. Plates made, (vulcanite) 383. Jaw cases under treatment, 140. Finished, 104. Cleansing and prophylactic treatments, 1,279."

Continuing Dr. Fauntleroy says: "There can be no question of the value of placing the teeth in order, as shown by the improved digestion and general good health following this work; but the great usefulness of a dental department to every hospital has only been recently generally recognized. In many instances the complications following operations are directly traceable to an unhealthy condition of the mouth. So true is this that the careful surgeon is beginning to insist upon a thorough inspection and treatment of the teeth, whenever it is practicable, before undertaking any major operative procedure."

The dentist used to be looked upon as a mere mechanic and next to the barber. Today he works hand in hand with the great surgeons of the world. A few years ago dentistry was a science by itself and the dentist was frowned upon by the physician. Today dentistry overlaps medicine, and the physician counsels and cooperates with the dentist in his endeavors to conserve the health of our people.

But this rapid and great advancement of dentistry brings with it additional responsibilities which the dentist of today and of the future will have to cope with or lose his standing as a progressive and up-to-date practitioner.

Raising the Status of the Army Dental Corps

In an editorial in February DENTAL SUMMARY you were asked to urge your Senator and Representative in Congress to support the new Army Dental Corps bills about to be introduced.

Telegraph your Senators to request Senator Chamberlain to incorporate in his defense bill, the recommendations of the Legislative Committee of the National Dental Association. *The responsibility is yours. May we depend on your immediate action?*

To Honorable Secretary of War, Washington, D. C.

Complying with your request in our interview this morning, we, the Legislative Committee of the National Dental Association, submit and recommend the following in order to increase the efficiency of the Dental Corps of the Army and secure a more equitable recognition of the Dental profession in matters of health and the military status of the Dental Corps:

1. A Dental Reserve Corps, similar to the Medical Reserve Corps, to replace the present "Acting Dental Surgeons," except that members of the Dental Reserve Corps shall be obligated to serve when called upon for active duty.

2. The Dental Corps to consist of:

(a) First Lieutenants, to be appointed from the Dental Reserve Corps after two years active service, who shall be not less than 23 nor more than 30 years of age, and otherwise qualified as at present.

(b) Captains, who shall be promoted to this grade after seven years of total service, including service in Dental Reserve Corps and as Contract Dental Surgeon, Dental Surgeon, or Acting Dental Surgeon.

(c) Majors, not to exceed 25 per cent. of the Dental Corps, to be promoted according to seniority, as in the Medical Corps.

(d) A Colonel, who shall be Chief of the Dental Corps, acting under the direction of the Surgeon General, to be appointed by the President, by and with the consent of the Senate, for a period of four years. The first Colonel to be appointed from the fifteen senior officers of the Dental Corps, after which they shall be appointed from the Majors of this Corps.

3. The strength of the Dental Corps to be as now provided (1 to 1,000 of the enlisted strength).

4. The service heretofore rendered as Dental Surgeon, Contract Dental Surgeon, or Acting Dental Surgeon, shall be computed as commissioned service.

5 The right to command shall be limited to the members of the Dental Corps and the Dental Reserve Corps and to enlisted men serving as their assistants.

Respectfully submitted,
Legislative Committee of the National Dental Association.

NEW PUBLICATIONS

Oral Surgery. A Treatise in the Diseases, Injuries and Malformations of the Mouth and associate, Parts by Truman W. Brophy, MD., D.D.S., L.L.D., Sc.D., F.A.C.S., President and Professor of Oral Surgery, Chicago College of Dental Surgery, President International Dental Federation, etc., with special chapters by Matthew H. Cryer, M.D., G. Hudson Mauken M.D.,William J. Younger, M.D., F. W. Belknap, M.D., Calvin S. Case, M.D., D.D.S. Philadelphia: P.Blakiston's Son & Co., 1012 Walnut St

The preparation of this great work on oral surgery has consumed many years and the fact that the first edition of five thousand copies was sold within the first few weeks after publication shows the favor with which it has been received. The author in his preface gives so good an outline of the general contents of the work that we will quote from it for the benefit of our readers:

"In 1886 I was appointed by the National Association of Dental Faculties to write a book on Oral Surgery. Many factors over which I had no control caused me to delay the task—and it has been a task—until the present time. During all this period I have neglected no opportunity to secure photographs, diagrams and plates to incorporate in the work. I have visited nearly every medical center in the world and have received many courtesies from both the medical and the dental professions. These men have laid before me, with true unselfishness, much interesting and valuable material. I have endeavored to collect and place this information in a systematic form before the student and practitioner.

I wish to emphasize an underlying principle of surgery—to so operate as to leave the parts in as nearly a normal anatomical condition as possible; and further, briefly and concisely, to supply students, physicians, dentists, and general and oral surgeons with information relative to the symptoms, diagnosis and treatment of conditions affecting the mouth and associated parts.

The book has been divided into two parts. The first deals with the principles of surgery, while the second is devoted to diseases, injuries and abnormalities of the oral cavity and associated parts.

First: The incorporation of these principles of surgery in the first part of the book has been in behalf of the dental student. It is just as essential to the dentist to understand these principles, in order to cope successfully with dental complications he so frequently meets, as it is for the physician to become acquainted with the underlying principles of dental pathology and oral hygiene in the successful treatment of many systemic diseases. I do not claim originality in presenting these principles of surgery, for they are common knowledge.

Second: During my experience of thirty-five years and more, I have been impressed with the fact that it is rare for the diseases of the mouth to receive from physicians the attention their importance demands. For example, this has been noticeable in dealing with trigeminal neuralgia. It frequently happens that patients complaining of this distressing malady are referred to me by physicians. The patients have undergone a most rigid general examination, but the physician has failed, in many cases, to take into consideration local conditions of dental origin which might account for the neuralgia. I have endeavored, therefore, to make clear its many local causes.

In the treatment of congenital cleft palate, which is not unlike a wound, the surgeon should aim to establish a normal bony arch, instead of covering the deformity by repairing the lip and, subsequently, closing the cleft by flaps, leaving the maxillary bones to remain through life like an ununited fracture. The principle of preserving normality in the regions operated on, applies to the treatment of empyema of the antrum of Highmore, trigeminal neuralgia, tumors of the face and mouth, *et cetera.* This includes avoiding facial mutilation by unnecessary external incisions.

I have deemed it advisable to incorporate several chapters which have been written for me by men for whom I have the deepest regard: The training of the voice, after cleft palate operations, is of such importance to those who have been operated upon for this defect in late childhood or adult life that I asked Dr. G. Hudson-Makuen to write this chapter. Those who operate on cleft palate will find much of value in it. The question of infant feeding has many times given me great concern, both before and after operating. Most of the infants I receive have been poorly nourished. This is not due alone to the fact that they suffer from cleft palate, but also that parents usually know but little about the proper care of artificially fed babies. Dr. F. W. Belknap has concisely placed the essentials in the care of an infant before the reader, although, of course, it is impossible, in a work of this kind, to fully cover the subject. In recent years the surgical engine has come into prominence and has proved itself to be of great utility in the hands of the surgeon. I, therefore, requested Dr. M. H. Cryer to write this chapter. On the subject of artificial vela, Dr. Calvin S. Case was kind enough to furnish the material. The chapter on "The Implantation of Teeth" is from the pen of Dr. W. J. Younger. The interest which has been shown of recent years in the field of oral prophylaxis has been dealt with under the head of Dento-Alveolitis and Infections of Oral Origin.

It has been my cherished wish that I might place before the dental and the medical professions the views I have long held relative to that markedly deforming condition—harelip and cleft palate. In this work I have devoted many pages to these afflictions. I have endeavored to convey my thoughts by words and illustrations in such a manner that no one will misunderstand and claim to be performing my operations when, in reality, he has omitted many of the essential details. I have seen many men perform operations which they claimed were mine but which, in fact, were far from my methods. Those who have met failures have been unacquainted with, or failed to employ, my technic. I have read and seen the work of every noted surgeon on this subject. I have devoted thirty years to the study of these deformities and I believe that the ideas expressed in the chapters on "Cleft Palate" and "Harelip" will stand the test of time."

The book contains 1065 pages of text and 909 illustrations including 39 plates in colors. It is one of the most comprehensive works on Oral Surgery that has ever been given to the dental and medical professions and the author and publishers are to be congratulated on the preparation and publication of so worthy a book.

American Illustrated Medical Dictionary. Edited by W. A. Newman Dorland, M.D., Eighth Revised and enlarged Edition. Philadelphia and London: W. B. Saunders Company 1915. Flexible leather, $4.50 net: thumb index, $5.00 net.

This edition of this standard dictionary has been carefully revised throughout and contains over fifteen hundred more terms than the previous edition.

It is a new and complete dictionary of terms used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Veterinary Science, Nursing, Biology and kindred branches, with the pronunciation, derivation and definition, including much collateral information of an encyclopedic character.

It contains new and elaborate tables of arteries, muscles, nerves, veins, etc. Also bacteria of various species, ptomains, leucomains, weights and measures, eponymic tables of diseases, operations, signs and symptions, stains, tests, methods of treatment, etc.

During the past two years, since the previous edition was published, a multitude of new tests, both clinical and laboratory, have been published, with the result that the list of tests— in the dictionary has been greatly increased. In fact this list has grown from ten pages in the original edition to nineteen pages in the present one. And there has been such a rapid and constant increase in the terminology of medical science that the text matter in this edition has been increased by some thirty pages. The book contains altogether 1137 pages.

SOCIETY·ANNOUNCEMENTS

Michigan State Dental Society

The sixtieth annual meeting of the Michigan State Dental Society will be held in Detroit, April 13, 14 and 15, 1916. Dr. F. B. Moorehead, of Chicago, a short-paper series and an ex-presidents' day, will feature the program. The meeting will be the largest and best in the history of the society.

Write Dr. Wm. H. Elliott, 1539 Jefferson Ave. E., Detroit, for space reservation. Dr. O. W. White, 406 Fine Arts Bldg., Detroit, will mail programs to non-members upon request.

C. G. Bates, *Secretary,*
Durand, Mich.

Michigan State Board of Dental Examiners

The next regular meeting of the Michigan State Board of Dental Examiners for the examination of applicants who may desire to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, June 19, 1916, at 8 o'clock a. m., and will continue through Saturday, June 24th.

For application blanks and all further information application should be made to

E. O. Gillespie, Secy-Treas.
Stephenson, Mich.

Odontological Society of Western Pennsylvania

The thirty-fifth annual meeting of the Odontological Society of Western Pennsylvania will be held at the Monongahela House, Pittsburgh, Pa., Tuesday and Wednesday, April 11th and 12th, 1916.

The first regular session of the society will open on Tuesday at 10 A. M.

The Executive Council will meet at the Hotel at 9:30 A. M. for the transaction of business in the interest of the society.

The clinics and exhibits will be at the Monongahela House. Exhibitors are cordially invited to visit this meeting, and requested to make early reservation for space.

A cordial invitation is extended to all ethical dentists in Pennsylvania and adjoining states.

King S. Perry, *Secretary,*
719 Jenkins Bldg., Pittsburgh, Pa.

Lake Erie Dental Association

The fifty-third annual meeting of the Lake Erie Dental Association will be held at Hotel Bartlett, Cambridge Springs, Pa., May 18, 19, 20, 1916.

Respectfully,
J. F. Smith, *Secretary.*
120 W. 18th St., Erie, Pa.

The Georgia State Dental Association

The forty-seventh annual meeting of the Georgia State Dental Association, will be held at Macon, Ga., June 8th, 9th and 10th, 1916, beginning at 11:00 A. M. Thursday, June 8th.

The Program Committee is making preparations to bring to this meeting some celebrities, who will give illustrated lectures on some very important topics concerning the dental profession; also same men will give clinics which will be more than interesting to all who attend the association. Besides these men, there will be a program of merit given by local dentists.

All ethical dentists in Georgia are respectfully invited to attend, and become members of this great State Association. We extend a most cordial invitation to the members of other associations to meet with us.

For further information, address the Secretary.

Dr. M. M. Forbes,
803-4 Candler Bldg., Atlanta, Ga.

The Louisiana State Dental Society

LAKE CHARLES
LOVES COMPANY

The Louisiana State Dental Society will hold their annual meeting in Lake Charles, one of Louisiana's most picturesque cities, beginning May first, and running through until the third day of the same month.

An exceptionally unique, interesting and instructive program has been arranged, and all visiting ethical dentists as might desire to attend are cordially invited.

The date of the meeting has been so advanced in order that exhibitors will not find the dates conflicting with those of the neighboring States, and that nearby dentists will be able to take advantage of this splendid meeting.

J. Crimen Zeidler, *Secretary,*
Suite 1129 Maison Blanche Bldg.,
New Orleans, La.

Nebraska State

The Nebraska State Dental Society will hold its 49th annual meeting May 15th, 16th, 17th and 18th, at Lincoln. Headquarters will be at The Lindell Hotel.

H. E. King, *Secretary*
Bee Bldg., Omaha.

Indiana State Dental Association

The fifty-eighth annual meeting of the Indiana State Dental Association will be held at the Claypool Hotel, Indianapolis, May 16, 17 and 18, 1916. Prospective exhibitors should write to E. D. McLaughlin, of Greensburg, Indiana, who is Master of Exhibits. The program will be made up exclusively of Indiana dentists and a cordial invitation is extended to members of other State Associations to attend this meeting.

A. R. Ross, *Secretary,*
Lafayette.

New Jersey State Dental Society

The Forty-sixth Annual Convention of the New Jersey State Dental Society will be held at Asbury Park, N. J., on July 12th, 13th, 14th and 15th, 1916.

The spacious glass enclosed Casino over the ocean has again been secured for the Exhibits and Clinics. Dr. A. S. Burton, of Asbury Park, as chairman of the Exhibit Committee expects to surpass last year's display, which was the greatest in the history of the society. Dr. George W. Wakeley, of Orange, is chairman of the Clinic Committee and having served on that committee for three years is well qualified to present those clinics of greatest interest.

The headquarters of the society will be located at the West End Hotel, just across the ocean drive from the Casino. Special rates to be, single rooms (one person) $3.50 per day, double rooms (two persons) $6.00 per day. Weekly rates of $20.00 for one and $30.00 and $35.00 for two persons. The ball room at the hotel will be used for all meetings of the society and Dr. James I. Woolverton, of Trenton, chairman of the Essay Committee has arranged for three essayists of prominence to present subjects of interest.

A cordial invitation to attend is extended to all ethical practitioners.

JOHN C. FORSYTH, *Secretary,*
430 East State Street, Trenton, N. J.

Illinois State Dental Society

The fifty-second annual meeting of the Illinois State Dental Society will be held at Springfield, Illinois, May 9th, 10th, 11th, and 12th, 1916.

President, J. P. Buckley, Chicago. Secretary, Henry L. Whipple, Quincy.

Thanking you in advance, I am

Very respectfully,
HENRY L. WHIPPLE, *Secretary.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

There was a lady lived at Leith,
A lady very stylish, man,
And yet, in spite of all her teeth,
She fell in love with an Irishman.

The Illinois State Board has opened a vigorous campaign against illegal practitioners. Goodness knows there's enough to do in Chicago alone to keep a lot of good men busy.

It is estimated that there are three thousand pupils in schools of Rock Island, Ill., whose parents cannot pay for dental attention, total income of family being $9 to $15 per week. Hence the need of free clinic, which is being tried.

In one school at Streator, Ill., thirteen children were found who had from two to ten teeth decayed down to the gums. Nothing had been done to stop the progress of destruction. Imagine such children trying to study or play, or do anything wholesome.

Madison, Wis., is to have free clinic if the Mother's Club has its way.

European war has proved that a soldier with poor teeth is about as effective as a rifle without cartridges.

Even New England is waking up. The Secretary of the State board of health announces that he has two—TWO—(2) full sets of slides for use in oral hygiene and general health campaigns. It is cheering to know that the slides always are out, and that the demand far exceeds the supply.

Much objection to the internal revenue tax on tooth-pastes. If pastes only are affected, may be a good thing to tax them out of existence. Glycerine is the base of all pastes, so far as I know; and glycerine doesn't make a bad culture medium for "bugs," does it—particularly in the presence of moisture at 98½ degrees?

We are now in position to supply MS. lectures for school and general public use promptly. Many calls have come and there has been some delay in the past.

Dr. W. C. Pierce, of North Fond du Lac, Wis., has been elected president of the Commercial club.

Look out! Mr. Sloppy Dentist; your habits are being noticed more and more every day; likewise your surroundings, office furnishings, etc. Boards of health in some cities are taking up the matter, and the first thing some of the Brethren know they may hear something in an official way that will not be pleasing. Better get in line.

An artificial tooth made for a retired race-horse has so completely rejuvenated the rickety beast that his owner means to enter the circuit again.

The Free Dispensary at Reading, Pa., opened January 12th.

Report from Paris says that dentists there are treating pyorrhea with sour milk, with great success. What about corns and ingrown nails?

No boy in Germany is allowed to have bad teeth. If his parents cannot pay for dental work, the government does. He must be in fit fighting condition every minute, and good teeth are recognized as an important part of his equipment. So much for preparedness.

Doesn't always pay to say what you think. Chicago dentists is suing another fellow for $5,000, alleged injury to his feelings, caused by unkind words spoken in presence of fiancee.

Cambridge, Mass., now has free clinic.

Prisoners at Iowa state penitentiary at Anamosa revolted and made serious trouble a week or two ago because their teeth were not properly cared for. Good; go to it. Perhaps authorities can be made to realize that a prisoner is a man, just the same, and has a right to public care. Later: Two dentists have been employed by the state to keep teeth of prisoners in order.

Chicago dentist arrested for snapping match-box at another fellow, who thought it was pistol. Released upon explanation.

Dr. M. H. Cazier is swinging around the circle exhibiting his vacuum mouth cleaner. The process has been tried out sufficiently to warrant a considerable degree of confidence in results.

An automobile dealer in Platteville, Wis., advertises: "If you buy one of my——automobiles, you'll never live to regret it."

Free clinic at Burlington, Ia., is now open for business.

Dr. J. R. McNeille, New York, will have to pay a patient $5,000 for permitting him to swallow a tooth extracted under general anesthesia. Tooth lodged in right bronchus, and remained there more than two years, causing frequent attacks of something resembling pneumonia, and was finally coughed up.

Pain in the heel is said by one investigator to be caused usually by defective second molar on the opposite side. The study of dentistry promises to require in the near future a more perfect knowledge of anatomy and pathology than the surgeon ever dreamed of.

Farmers break down more quickly than city men after middle life because they do not care for their teeth—says Dr. Henry B. Favill, of Chicago, a surgeon. There's still plenty of missionary work for the small-town dentist.

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVI APRIL, 1916 No. 4

OFFICIAL ORGAN

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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Neither the editor nor publisher is responsible for the views expressed by authors in the reading matter published by THE DENTAL SUMMARY

REGULAR CONTRIBUTIONS

RESISTANCE AND RETENTION FORM IN CAVITY PREPARATION*

BY W. H. O. MCGEHEE, D.D.S., M.D., CINCINNATI, OHIO

PROFESSOR OF OPERATIVE AND PROSTHETIC DENTISTRY AND SUPERINTENDENT OF CLINICS IN THE OHIO COLLEGE OF DENTAL SURGERY

WHEN I WAS REQUESTED by the program committee to present, at this meeting, a brief discussion of some phase of cavity preparation I was at a loss to determine why this well-worn subject should have been designated as the medium through which I should make my initial appearance before the Ohio State Dental Society. The fact of the matter is, I was, on first thought, tempted to appeal to the tender mercies of the aforesaid committee, requesting that I be extended the privilege of choosing a topic which would allow of greater scope for originality on the part of the essayist.

However, after further consideration, I remembered with feelings of *ennui* the criticisms, originating from certain members of various State

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*Read before the Ohio State Dental Society, Dec., 1915

Examining Boards, and reaching me through indirect avenues of information, of the methods incident to the various steps of cavity preparation, as taught by me, with the result that I finally welcomed the opportunity thus afforded of publicly stating my position in regard to the matter.

The technic of the preparation of cavities was a number of years ago placed on a definite scientific basis by the lamented Dr. G. V. Black and his co-workers. The theories incident to "extension for prevention," the correct bevelling of enamel margins and the adoption of the "box" form in the preparation of the internal parts of cavities, are now accepted practice among the great majority of modern operators who read and keep abreast of the trend of thought and development of the twentieth century. Black cavity preparation is officially recognized and advocated by the American Institute of Dental Teachers, is taught in most of the recognized Dental Colleges of this country and is the only method described in any modern text-book of operative dentistry published in the United States, including the works of G. V. Black, The American Text-book of Operative Dentistry, Johnson's Operative Dentistry, Marshall's Operative Dentistry, Davis' Essentials of Operative Dentistry and my own modest book on Operative Technics.

If one will avail himself of the opportunity to consult any of these works, he will at once discover that the cavity forms therein advocated do not admit of the formation of a groove on the gingival wall of proximal cavities, thereby interfering with the source of nourishment, via the dentinal tubules, to that portion of the tooth lying mesially or distally to the groove, as well as mechanically weakening that area. He will likewise perceive that in none of these authorities is there advocated the obsolete practice of weakening labial, buccal or lingual walls by the placing of grooves in those areas for the retention of fillings. He will also find it to his own interest, as well as to that of his patients, to note that the proper extension of the marginal outline into immune areas is not the extremely radical procedure he may have imagined it to be. In this connection it would seem that the pertinent question propounded at the bottom of one of the pages of the program of this meeting is particularly *apropos*, viz.: "This is the twentieth century; are you still living in the nineteenth?"

As is well known to my hearers, the operations incident to the proper preparation of cavities may be divided into five steps, as follows, viz:

STEPS IN CAVITY PREPARATION

First: Establish the outline form.

Second: Remove the decay.

Third: Give the cavity form
- a—Convenience form.
- b—Resistance form.
- c—Retention form.

Fourth: Bevel and polish the enamel margins.

Fifth: Perform the toilet of the cavity.

Owing to the limited time allotted me by the program committee, I shall very briefly discuss a few phases of the subject incident to the operation of giving the cavity proper resistance and retention form. In doing so I shall present very little of anything that is new or original, but only that which, as previously mentioned, is now considered accepted practice.

Resistance Form may be defined as follows, viz: "The so shaping of the walls of the cavity that they may be best enabled to withstand the *stress* brought to bear on the filling during the act of mastication." As is well known, the amount of stress brought to bear on the teeth during the chewing of various foods is frequently very great, varying in different individuals and on different teeth of the same denture, and ranging as measured by the gnatho-dynamometer from 75 to 175 pounds as an average. When we remember this and take into consideration the fact that the stress may, as a result of accidental and unexpected sudden contact with oyster shells, spiculae of bone, bird shot, grape seed and similar substances be increased to 250 pounds or more, the importance of the necessity for proper resistance form is accentuated.

In mechanics the general form of a cavity which is to receive an inlay is the box or *mortise*. This general idea may readily be applied in preparing cavities in teeth. In this form, all of the walls of the mortise are on plane or straight lines, joining each other at definite *line* and *point* angles. The adoption of this form is advocated for several reasons, viz:

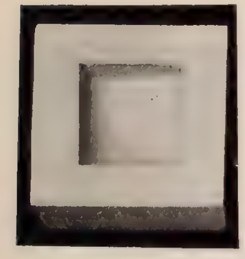


Fig. 1

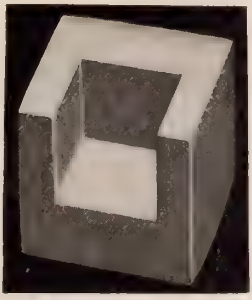


Fig. 2

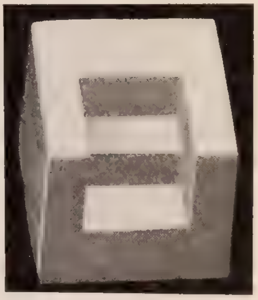


Fig. 3

Fig. 1—Simple mortise on one surface.
Fig. 2—Simple mortise form involving two surfaces.
Fig. 3—Compound or auxiliary mortise (step form.)

First: The seat for the filling is thus placed at a distinct right angle to the line of stress, a condition which is considered ideal in all construction work.

Second: Gold and other filling materials are most readily adapted against plane surfaces.

Third: The tendency to splitting away of the buccal and lingual cuspal elements in bicuspids and molars is thus greatly diminished, the filling otherwise acting as a wedge.

Fourth: The cavity is thus rendered more accessible to view and further operative procedures.

Fifth: The properly *wedged* filling is thus most securely gripped in place by the normal resilience or elasticity of the dentin.

The *Mortise Forms* which may readily be adapted to procedures incident to giving cavities resistance form may be mentioned as follows, viz:

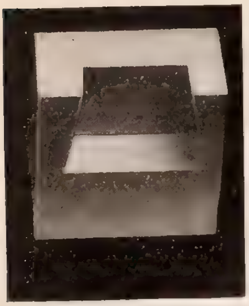


Fig. 4

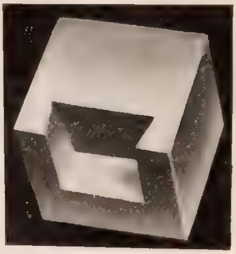


Fig. 5

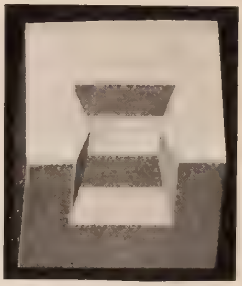


Fig. 6

Fig. 4—Simple dovetail mortise on one surface. The plaster cube has been sawed in half to show the inside of the cavity, which is dovetailed on two opposite surfaces.
Fig. 5—Simple dovetail mortise on two surfaces.
Fig. 6—Compound dovetail mortise.

First: The simple mortise on one surface (Fig. 1).

Second: The simple mortise involving two surfaces (Fig. 2).

Third: The compound or auxiliary mortise (step form), (Fig. 3).

If the case in hand be an occlusal, a "gingival third," or a simple approximal cavity, the simple mortise form involving one surface is adapted and modified to suit our needs. In proximo-occlusal cavities, where the strength of buccal and lingual walls permits and there is no involvement of deep occlusal grooves and fossae, the simple mortise involving two surfaces may be used; while, if the occlusal grooves and fossae are deeply fissured, the compound mortise or step form is indicated. In the case of proximal cavities on incisors and cuspids involving the angle, the compound mortise is used, adapting it to the conditions presented by preparing an incisal step or a lingual auxiliary extension.

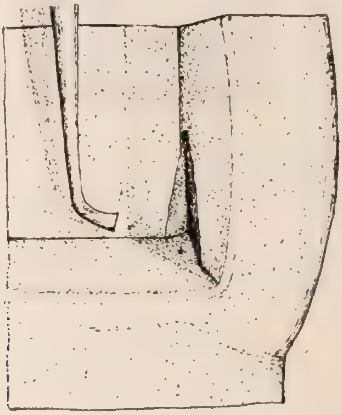


Fig. 7

Fig. 7—Accentuating the gingival point angle for retentive and convenience form.

After the proper resistance form is obtained, it then becomes necessary to provide against *tilting* and *lifting* stress by giving the cavity proper *Retention Form.* This is largely provided for by transforming the simple or compound mortise into the dovetail mortise form. Figures 4, 5 and 6 illustrate the method of dovetailing these mortise forms. The three mortises previously mentioned are thus transformed into

First: The simple dovetail mortise on one surface (Fig. 4).

Second: The simple dovetail mortise involving two surfaces (Fig. 5).

Third: The compound or auxiliary dovetail mortise (step form) (Fig. 6).

In *Figure* 4 the plaster cube has been sawed in half to show the method (here largely accentuated for purposes of illustration) of dovetailing two opposing walls. It will be observed that no *grooves* or *pits* are discernable in any of these mortises, and, as has been mentioned previously, at no stage of modern cavity preparation are they considered admissible. In proximal cavities on incisors and cuspids, whether the angle be involved or not, and in proximo-occlusal cavities on bicuspids and molars, for greater convenience in starting fillings and for additional retention, the deepening of the point angles on gingival walls is not only considered admissible but frequently necessary.

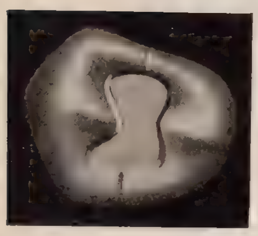


Fig. 8

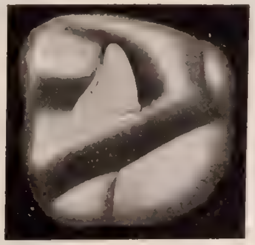


Fig. 9

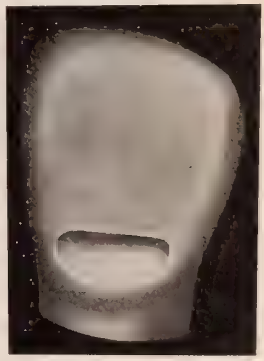


Fig. 10

Fig. 8—Cavity involving occlusal groove on an upper bicuspid.
Fig. 9—Cavity in central fossa of an upper molar.
Fig. 10—Cavity in the gingival third of the labial surface of an upper central incisor.

Figure 7 illustrates the form obtained by this procedure, though an inverted cone bur, one half to one millimeter in diameter, is frequently a better instrument for accomplishing the desired result than the excavator shown. The illustration was not originally made for this paper, but was intended for use in lectures to freshmen students, who are not permitted the use of the dental engine. On inspection, it is seen that the point angle is accentuated, at the expense of the perpendicular walls of the cavity and not at that of the gingival wall. In addition to this, it will be observed that the line angle formed by the junction of the perpendicular walls is also deepened for a short distance for greater security in anchoring the filling. The same class of instruments is used and the same method is followed in accentuating the point angles in other localities when it is deemed necessary. The preparation of the incisal point angle in proximal cavities is frequently facilitated by the use of hatchet and hoe excavators. This angle should be deepened slightly at the expense of the labial and lingual walls as well as in an incisal direction.

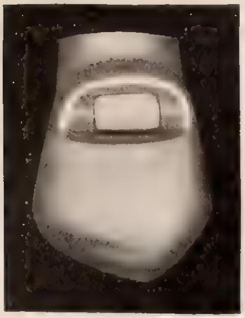


Fig. 11

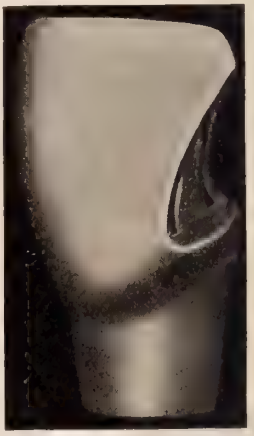


Fig. 12

Fig. 11—Another form of preparation for cavities located in the gingival third.
Fig. 12—Proximal cavity on an upper central, showing the flat gingival wall. Labial view

A study of the additional illustrations accompanying this article will readily reveal the manner of adapting the various mortise forms to all classes of cavities.

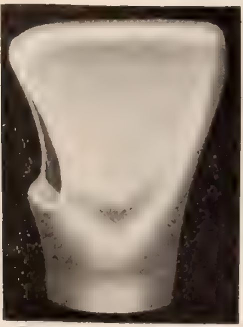


Fig. 13

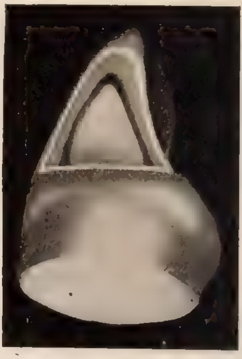


Fig. 14

Fig. 13—Lingual view of cavity shown in Fig. 12.
Fig. 14—The same cavity from a different aspect.

SIMPLE MORTISE FORM ON ONE SURFACE

Figure 8 reveals a cavity prepared on the occlusal surface of a bicuspid tooth, illustrating the method of adaptation of the simple dovetail mortise on one surface to the case in hand. *Figure* 9 illustrates the adaptation of the simple dovetail mortise form to a cavity occurring in the central fossa of an upper molar. *Figure* 10 shows the method of adaptation of the simple dovetail mortise form to the gingival third of the labial surface of an anterior tooth. *Figure* 11 reveals a form which was first advocated by Dr. Thomas E. Weeks. It is an adaptation of the simple mortise form to a cavity in the same locality as the preceding one. A box-shaped cavity is first prepared with four definite point angles and then bevelled out to the margins, a procedure better adapted to the technic laboratory.

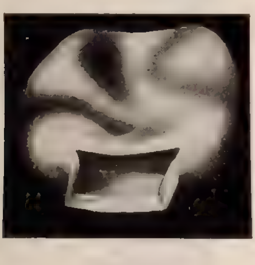


Fig. 15

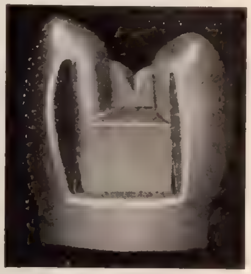


Fig. 16

Fig. 15—Application of the simple dovetail mortise to disto-occlusal cavity in upper molar.
Fig. 16—Proximo-occlusal cavity in upper bicuspid. Compound mortise or step form.

Figure 12 shows an adaptation of the simple dovetail mortise form to cavities on the proximal surfaces of any of the anterior teeth which do not involve the angle. *Figure* 13 represents a lingual view of the same cavity, with its flat seat especially in evidence. *Figure* 14 shows the same cavity from a different aspect, illustrating the method of accentuating the incisal point angle for purposes of retention.

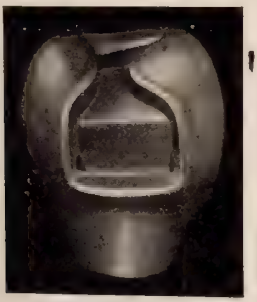


Fig. 17

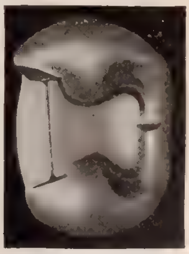


Fig. 18

Fig. 17—Proximo-occlusal cavity in upper bicuspid.
Fig. 18—Occlusal view of a compound mortise form in an upper bicuspid.

SIMPLE MORTISE FORM INVOLVING TWO SURFACES

Figure 15 reveals the method of adaptation of the simple dovetail mortise form involving two surfaces to the case in hand. The mortise form has been dovetailed at the expense of the buccal and lingual walls in the case of a disto-occlusal cavity, where the distal fossa was not deeply grooved.

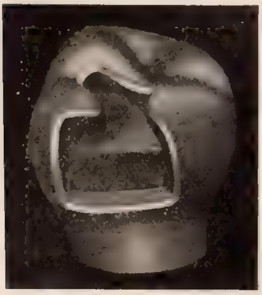


Fig. 19

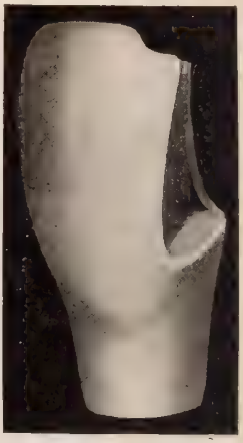


Fig. 20

Fig. 19—Step form in a mesio-occlusal cavity in an upper molar.
Fig. 20—Mesio-incisal cavity on an upper central incisor. Labial view.

COMPOUND MORTISE FORMS

Figure 16 illustrates the adaptation of the compound dovetail mortise form to a proximo-occlusal cavity in a bicuspid, showing its absolutely flat gingival wall, and the deepening of the point angles on that wall. *Figure* 17 presents the method of adaptation of the compound dovetail mortise in a bicuspid cavity similar to the one preceding. *Figure* 18 presents an occlusal view of the same cavity, with its flat seat and step, and illustrates the method

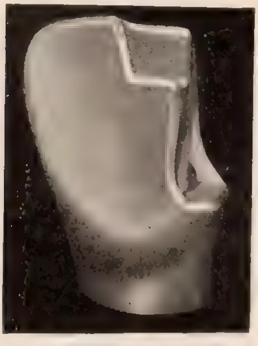


Fig. 21

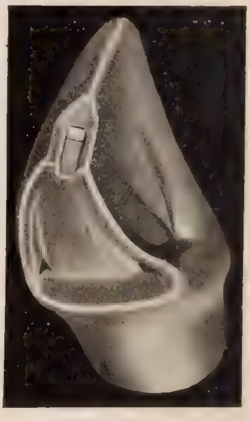


Fig. 22

Fig. 21—Lingual view of cavity shown in Fig. 20.
Fig. 22—Another view of the same cavity.

of dovetailing, by making the step wider at its extremity than at its beginning, with the result that the filling is locked in place and tilting stress is resisted. *Figure* 19 shows a proximo-occlusal cavity on a molar with a modification of the compound dovetail mortise form to the case in hand. Dovetailing of the step in the same manner as shown for the bicuspid cavity in figure 17 is noticed, to provide against tilting stress.

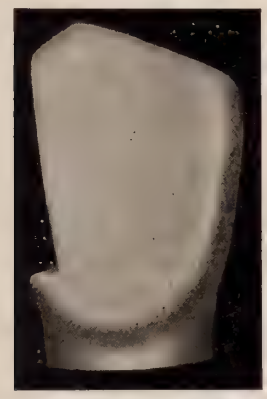


Fig. 23

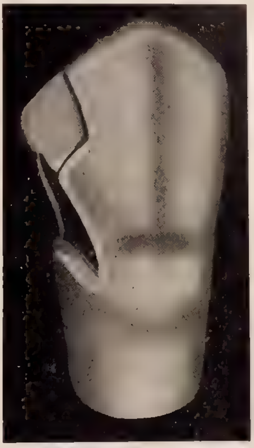


Fig. 24

Fig. 23—Labial view of proximo-incisal cavity in upper cuspid.
Fig. 24—Lingual view of same cavity shown in Fig. 23.

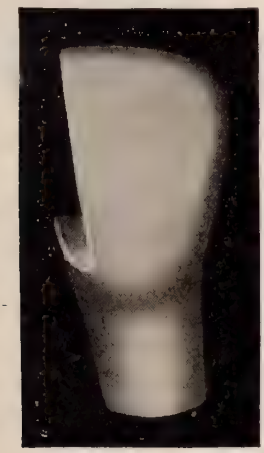


Fig. 25

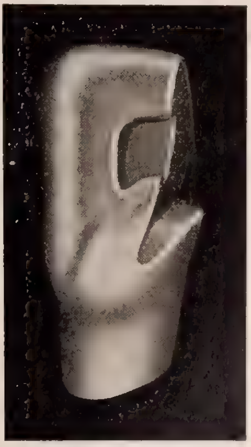


Fig. 26

Fig. 25—Labial view of proximo-incisal cavity in upper lateral incisor.
Fig. 26—Lingual view of same cavity. Compound mortise form.

Figure 20 represents a cavity on the proximal surface of a central incisor involving the angle, and shows the method of adapting the compound dovetail or auxiliary mortise form to the case. Its flat gingival seat and the deepening of the gingival point angles are well shown. *Figure* 21 shows the same cavity from the lingual surface, with its flat gingival wall. The *incisal step* has been made largely at the expense of the lingual surface, trying to preserve as much of the labial enamel plate as possible. *Figure* 22 affords an excellent view of the same cavity from a different aspect. *Figure* 23 reveals a labial view of a proximo-incisal cavity on a cuspid, with its flat seat. *Figure* 24 presents the lingual view of the same cavity, showing the method of transforming it into the compound mortise form by cutting a step, largely at the expense of the lingual wall. Very little of the labial enamel plate has been taken away.

Figure 25 shows a labial view of a cavity occurring on an upper lateral incisor. The cavity involves the incisal angle. *Figure* 26 affords a lingual view of the same cavity. Instead of making an incisal step, as was done in the case of the central and the cuspid, it is, in many instances advisable to adapt the lingual step form, cutting an extension over onto the lingual surface as shown here. It will be observed that the gingival wall has not been made absolutly flat, but has been cut deeper at its labial and lingual terminations, following the curvature of the gingival line. That was done with this general idea in view, viz: in the case of the lateral, owing to its small size, if an absolutely flat seat had been made, the seat would have been so small that it would have offered very little resistance against the stress of mastication, whereas in the method used, a larger area was afforded for the filling to rest against.

A classification of the mortises previously mentioned may now be presented as follows, viz:

First: Simple mortise on one surface.
Second: Simple dovetail mortise on one surface.
Third: Simple mortise involving two surfaces.
Fourth: Simple dovetail mortise involving two surfaces.
Fifth: Compound or auxiliary mortise (step form).
Sixth: Compound or auxiliary dovetail mortise.

Foot Note—(The illustrations used in this article are taken from the author's book on Operative Technics and the plates have been kindly loaned by the publishers, Messrs. P. Blackiston's Son & Co., Philadelphia.)

HOW TO MAKE A PIN FOR A CROWN

BY R. B. BRASWELL, D.D.S., MANSFIELD, LA.

Take a 22 K. 30 ga. plate, cut into four or five pieces V-shape and place on top of each other, and between each piece place solder 18 K., flux, bind with wire, hold over flame and flow solder.

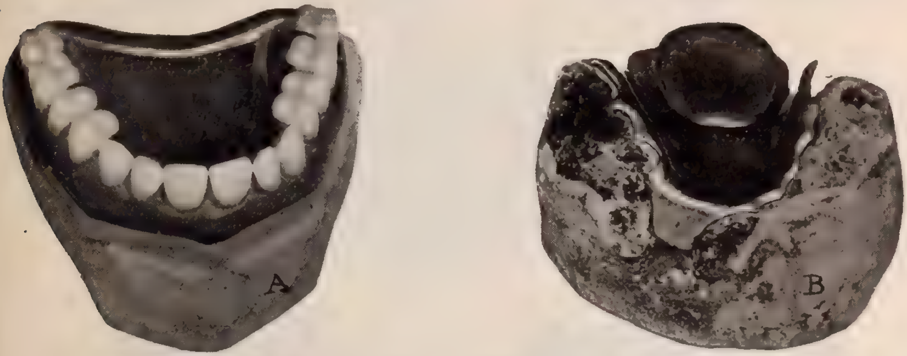
You have a square pin which can be ground round if desired. I prefer a square one as it holds better. This makes a very rigid pin and an inexpensive one, as you can use scrap gold. It will stand soldering without affecting the pin, and you have a tapering pin that fits the root. I call this an emergency pin. Living in town where there is no supply house, this gives a pin for immediate use. I make all my pins as I prefer them to any other.

ACQUIRED AND CONGENITAL CASES OF PERFORATION.

BY DRS. J. E. KURLANDER AND H. J. JAULUSZ, CLEVELAND, OHIO.

IN REPORTING the two following cases of perforation of the palate, we will first mention that of the father, and secondly that of the child or son. In the case of the father, Mr. ——, who was forty-six years of age, we found that he had acquired syphilis at the age of twenty-nine years, and at the age of forty the perforation of the palate became noticeable, which continued to increase in size until the whole palate became involved.

It was at the age of forty, or six years before we saw the patient, that the disease had reached its tertiary stage, and at which time begun its ravages on the membranous and osseous tissues, first showing the characteristic patches on different parts of the membrane, which continued until the tonsils and uvula were destroyed and finally taking away, with its ravages, the bony tissues of the palate.



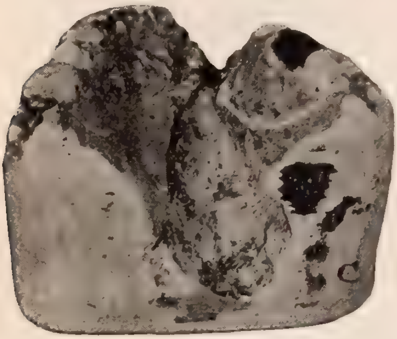
A represents the denture resting upon the model.
B represents the appliance of the boy.

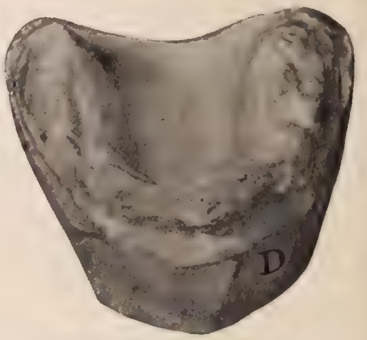
The palatine walls of both antral cavities having been broken down by the disease, the patient was in a condition which rendered it almost impossible for his friends to understand him when talking.

He had been treated with salvarsan four times, at intervals, and when we saw him the disease seemed to have been checked to some extent.

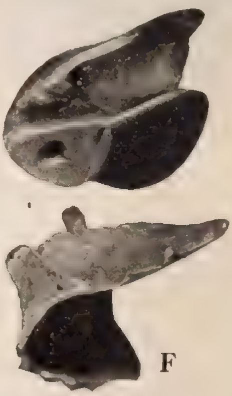
The patient, after contracting the disease, married and became the father of three children, the oldest a boy, was born with a cleft palate and harelip as a result of this disease, the history, diagnosis and prognosis of which we will mention further on in this article.

In making the obturator for the first case, or that of the father, we first washed out the cleft thoroughly with glyco-thymoline, full strength, coated the parts with sweet oil, and then pressed soft wax into the cavity, filling it so that the palatine surface of the mouth was restored to its normal shape. We removed the wax and reproduced from it a piece of hollow aluminum, which was inserted into the cleft. To make the aluminum hollow, we took an impression of the wax model in two sections, with plaster Paris, and covering the inner surface of the two sections of this plaster impression with a thin sheet of wax, poured plaster into it, which gave us the size and shape of the wax model; this we invested in the flask, with pieces of aluminum attached to the plaster inside of the wax sheets and extending into the plaster investment in the flask, to prevent its position from being changed. After melting out the wax, we cast an aluminum shell. After polishing the aluminum shell, we inserted it into the cleft, the same being held securely in position by the adjacent muscles which grasped and held it firmly and prevented any liability of its falling, or changing its position.



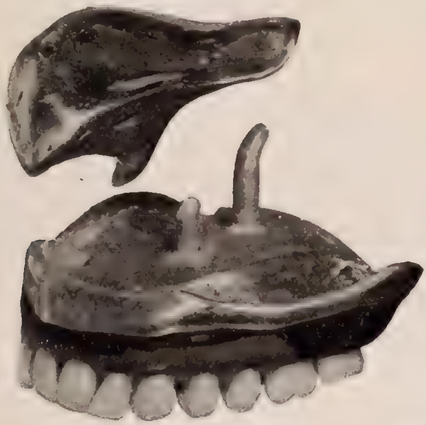


C represents the model of the boy.
D represents the impression of the father.



E represents the front view of the boy's case.
F represents the completed appliance for the boy.

The patient having lost the upper teeth, we made a cast aluminum plate and attached the teeth to it with rubber. Into the lower surface of the shell, which fit into the cleft, we made two holes about one-eighth of an inch in diameter and about a half-inch apart. In casting the aluminum plate we attached two posts of the same metal, to fit into the holes in the shell for the cleft, the anterior post being straight and about a half-inch in length, while the posterior post was about an inch in length, with the upper end curved to an obtuse angle, which pointed it backward. When the plate was put into position the two posts passed into the holes in the shell of the cleft, which not only assisted in holding the plate in position, but also aided in removing the shell from the cleft when necessary to clean. This man was the father of three children. He transmitted syphilis to the mother and all three of the children had the hereditary taint. The child previously referred to in this article, was a boy nine years old when we saw him, and was born with a cleft palate and harelip. He had never been able to talk with any degree of distinctness, and had to assist with signs to make himself understood. He had a double cleft, due to the presence of membranous tissue, about an inch in length, through which we made an incision, converting the double into a single cleft. To correct the condition which presented itself in this case, we took an impression in wax of the cleft. While the wax was in position and soft, we had him swallow several times, thereby causing the muscles, used in deglutition, to make an impression in the sides of the wax. We removed the wax and carved it, so that the muscles would fit closely in the lateral spaces between the upper and lower surfaces.



G represents the complete appliance for the father.

We proceeded to make a hollow shell of aluminum as described in the case of the father. This being accomplished, the shell was placed in position and a plaster impression of the mouth and space caused by the harelip, was taken. On the model, from this impression, we made a cast aluminum plate to cover the harelip space and also the roof of the mouth.

A hole was made in the shell for the cleft for the reception of an aluminum post, on the palatine surface of the plate, as in the obturator for the father. To the aluminum which filled the harelip space, we vulcanized gutta-percha, which was tinted, to make it correspond in color and appearance with the adjacent tissues of the lip. The child's breathing and speech were restored to normal, and the closure of the harelip space made his appearance natural.

2496 E. 9th Street.

PRESIDENT'S ADDRESS*

BY W. L. MYER, RENSSELAER, IND.

WE ARE AGAIN ASSEMBLED in annual meeting, and as your presiding officer, in fulfillment of one of our customs, I rise to give you what is known as the President's Address. I wish first to thank you for the honor conferred in selecting me to be your president, the twenty-seventh of this society.

In the beginning I want you to know that I do not take any of the credit for making this meeting the success that I feel sure it will be, for on the shoulders of Dr. Dailey and Dr. Wildason have fallen most of the burdens and to them and to Dr. Van Kirk, who has secured the exhibitors, and without whom the meeting could not be a success, is due the credit for the success of this meeting.

We are living in a progressive age and belong to a progressive profession, We cannot have progress without efficiency. Now that the whole thought of the day is advancement and efficiency, how are we to do our part in this vast movement? Each one of us has his part to play; we are all but units in this one vast scheme of advancement, so let no man fail in doing his part to uplift and enlighten, to learn so that he may teach, and thereby do his duty to the public to the fullest measure.

In my brief address I shall make a plea for a better individual dentist, therefore better dentistry, for without a better individual dentist we can not hope to raise the standard of the profession. Dental work of today is far better than it was ten years ago, but it is not impossible for most of us to still improve on much of our work. It is just as well that we should improve as it is that our patients do, because by rendering better services we are raising the standard of the dental profession, and by doing this the result is that the dentists will receive better compensation in return for their services.

It is impossible for a few men to bring about this new era in our profession without the assistance of the dentists as a body. It is impossible for a few men to educate the public as to the needs and results of dental care of the teeth. The Oral Hygiene movement has done much toward public education, but we have not aided this movement as we should. The more intelligent patients are, the more they know of the results which follow lack of care of the teeth, the better patients they will make you, and a higher appreciation they will have of your services, and the fees will be governed accordingly.

Many patients would have better work done if the dentist would only take time to tell them that such a thing were possible. But instead of spending a few moments time in explaining, the dentist goes ahead and does the kind of work which is easiest for him to do, while with a little more time and skill devoted to the same patient he would double, yes treble, the fee which he ordinarily secures. Don't understand me to say that all dentists do this, for some of them do not, but the percentage of those who give the patient the best that is in them is shamefully low.

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*Read before the Northern Indiana Dental Society, 1915.

Most people are willing to pay for value received and any number of them are walking around with money to spend, and if they are shown that a certain piece of work is better for their case than some other, and then if we prove to them that we have been working for their interest, reward will be ours. If we are careless and put in, for example, an amalgam filling for one dollar, the work no doubt is not worth half that much, because we do not spend the time that is necessary to do the work according to our better judgment. But on the other hand, suppose we know that we are going to receive ten dollars for the same filling, would we not do better work? I merely use this as an example that each of you may stop for just one moment and see if he can not recall time after time, when if he had rendered better services he would have received a more liberal fee. When you place the fee at one dollar for an amalgam filling you are setting the price on your services; and let me say right here that unless we aim high we will never accomplish that which is possible, for "As a man thinks that will he do."

It is a well known fact that the body must follow the trend of the thoughts contained therein, so if your thought is not to improve upon each piece of work just turn a leaf and begin thinking along a different line. Resolve to do better work and you will accomplish it. Some men are better operators than others, but there is not a man in the profession who can not improve if he applies himself.

This address is of necessity rambling in its nature as I have selected no particular subject for discussion, my aim being to sow the seed of discontent in the heart and mind of the stand-pat dentist, the dentist who graduated from dental college five or more years ago and has not attended a dental meeting, or has not tried to keep pace with the pace makers of the profession, I say tried, some of us fall way behind the pace-makers but we should be among the ones who at least try.

If some one after hearing my few words will resolve to do better dental work, to render a better service to humanity and to receive for his services a fee commensurate with the service rendered, I shall feel that the time spent is not in vain.

Attend all the dental meetings that are in your reach, attend the lectures and discussions, don't just merely go to the meeting for the sake of the outing or to be with the bunch, but go for your professional advancement. By all means hear the two papers at this meeting, as they are of vital importance. You may hear how one of your poorly fitting crowns or a bad root filling has caused a patient to have an attact of appendicitis, acute inflammatory rheumatism or endocarditis and you may see and hear some things that will prompt you to do better dental work, it may be more convincing than the things I am saying to you, for all of us are going to see X-ray pictures of our crowns, bridges, inlays and root-canal fillings, and we are going to realize as never before the necessity for conscientious dental work.

Here are a few things if you don't know about you should look into:

"Crandall's method of alloy filling."

"Callahan's work on root-canal treatment and filling."

"Fischer's Local Anesthesia in Dentistry."

"Clapp's Prosthetic Articulation."

"Rosenow's Local Foci of Infection and their relation to Systemic Diseases."

There are so many fields of endeavor that it is hard to tell what to leave out and what to put your time on.

You will see a clinic at this meeting on "Conductive Anesthesia." I have seen this clinic three times and I am sure I can profit by seeing it again. If you can master conductive anesthesia you will be the real-for-sure painless dentist. I could give some personal experiences but time and modesty forbid. Another clinic you will see is a method of accurately taking an impression, and in fact, you and I can learn from each and every one of these clinics.

Dont forget the exhibitors. They always have something new and practical, and we will have a great array of exhibitors for a little dental meeting like this. They will have some little device that will save you hours of time; look them all over carefully. I feel that I am imposing in taking so much time and not saying anything, so in closing let me say, constantly ask yourself the question: "How can I improve on my next piece of work?"

A BUSINESS SIDE OF DENTISTRY.*

BY JOHN O. ZUBROD, D.D.S., EVANSVILLE, IND.

THE PAPER NOW BEING READ to you meets with the hearty approval of the writer, as this is my hobby; if it don't meet with your approval then it is your privilege to disagree, for I don't like a man to agree with me on every subject. Am sure that at least fifty per cent. of the paper is good, leaving only fifty per cent. bad, and am living in hope the discussion will strengthen the latter. These ideas have been gleaned from a mass of literature, from talks with members of our profession, both ethical and non-ethical, and from practical experiences covering a period of many years.

I shall not try to tell you how to practice dentistry, as you qualified by passing your College and State Board examinations, and let me say right now there may be as good dentists elsewhere, but there are none better anywhere. Shall not tell you how to sell your services, as that is a matter of your own personality, neither shall I tell you what to charge in the way of a fee for your services as that is your privilege. Am sure you are all progressive men or you would not be here today, and furthermore you cannot attend dental meetings, and absorb knowledge without giving something in return.

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*Read before the First Indiana District Dental Society, 1915.

The answer to this paper cannot be worked out the same as a mathematical or chemical problem. All we need is backbone, common sense and diplomacy. You have been reading a lot about the business side of dentistry, the subject will not down, and as my friend, Dr. Raper, said: "If you find anything new in this article, I'll eat the paper," so for the sake of an argument we will start to talk about money.

Am going to tell you how we collect the fee we charge for our services. On a screen separating the waiting room from the operating room is a neat little sign, "Terms Cash." Duplicate signs are before each operating chair. These signs are there for the benefit of myself.

Our patients are divided into two classes; first, all patients we have worked for that have paid their accounts; second, all new patients, and the old patients we have worked for and are slow pay. By slow pay we mean those that promise and promise and pay a year late (maybe). A careful examination is made of the mouth and all defects marked on a chart. All large cavities are figured for treatment, ten per cent. is added for extras, and the patient is told what the work will cost. If the mouth is in a deplorable condition, the patient is told what the cost of cleaning will be, after which he will be told the cost of complete work. If the work to be done is a small operation for one of our good patients, or the new patient has an A No. 1 credit rating, they are not told the cost, unless they ask. If the work to be done is a large operation, it don't make any difference who they are, they are told what the price will be. This is the time we have our argument before the work is done, not after. If the cost meets with the approval of the patient, engagements are made and work completed. If the cost meets with the disapproval of the patient, that ends the case, they owe us nothing, we owe them nothing. If the work is done and the patient is a cash patient, the ten per cent. is deducted if no extras arise. If it is one of these good but slow pay, the ten per cent. is left in to cover cost of collection. None of your good patients will object if you use business methods in your practice. My patients seem to appreciate it. When work is completed a statement is given to all patients. (Pardon me for using such words as money, cost and price).

I never have been able to buy stamps on credit, neither can I buy gold from my dealer on thirty, sixty or ninety days; the writer is going to be censured for using the word dollar; however my family can't live on air.

On the first of each month a statement is mailed to all patients having an account with us. Along with the statement is a card reading like this:

> MODERN BUSINESS METHODS IN THE PRACTICE OF DENTISTRY
> PATIENTS WILL BE TOLD THE COST OF THEIR WORK BEFORE IT IS BEGUN. A STATEMENT WILL BE PRESENTED TO THE PATIENT WHEN THE WORK IS COMPLETED. TO ALL PATIENTS HAVING AN ACCOUNT WITH US, A STATEMENT WILL BE SENT ON THE FIRST OF THE MONTH REQUESTING PAYMENT IN FULL ON OR BEFORE THE TWELFTH DAY OF THE SAME MONTH. BY STRICT CONFORMING TO THIS RULE, WHICH APPLIES TO ALL ALIKE, NO MISUNDERSTANDING CAN ARISE.
> DR. ZUBROD.

We have a lot of patients that pay by the year, but they get a statement every month just the same, showing just how the account stands, and their accounts are drawing interest. This monthly statement idea started by Dr. Kells of New Orleans, and the dentists of every community could enter into a similar agreement.

When one of your good patients on leaving the office says: "Doctor, send me a bill and I'll send you a check," don't forget to mail a statement as he wants to pay. You have nobody to blame but yourself for the slow account. Many a good hard-earned dollar is waiting for you if you ask for it, and it's not beneath my dignity to ask the patient to pay. Don't let the account get moth eaten; many a good patient has forgotten he owes you, and the longer you wait, the less memory he has of the amount. Your own good judgment must govern you, but don't forget your backbone, common sense and diplomacy.

Several of the non-ethical dentists of this city are riding around in automobiles, and we are walking. Why? Because they are good business men; if payment is not received by the latter part of the month, and the patient is on the borderland between the first and second class, we send them a letter asking them to please conform to the rule of the office, or write them a letter like this: Dear Sir: This month we are giving our collector some good accounts in order to encourage him, one of which is yours. He will call on you about the 25th. Please encourage him by having your check ready when he calls. Yours truly, Dr. Zubrod. If the account drags along for several months, and a personal call does no good, we file the card away among the dead ones, and give the party a new rating in the credit guide, as the writer does not believe in threats or law suits.

The second class of patients are the ones you never have worked for, the slow pay, you know the ones that never keep a promise, and look out for that new patient that comes to you with a knock for his old dentist. Examination is made and price given plus 10%, for example say $12.00. They are told the work will take three sittings and at the end of each sitting they will have to pay $4.00. This is the time to have your argument, before not after. At the last appointment deduct the 10% if possible. If a crown, bridge, or denture is to be made, ask for and collect one-third cost of the work. The first treatment for those that call for the releif of pain, $1.00 is charged and collected, as these patients seldom return, and you have been paid for your time. If the patient has no money, relief is given to all suffering; we have our charity patients as well as you. We also have in this city a free dental clinic for the poor children.

If the patients return several times and prove good patients, credit is given them if they want it; if the new patient has an A No. 1 credit rating they automatically enter the first class and no demand is made for money. The new patient is the one we have trouble with. The average young dentist congratulating himself that he is building up a large practice, encourages the slow and poor pay by extending credit. He had better sit down and study his dental journals, than stand up and work for nothing. In ten years' practice we have kept our losses down to less than 1% of all work done.

Now remember "as you sow, so shall you reap." As I said before this is my hobby, and the paper meets with my hearty approval, and I hope the discussion will strengthen rather than weaken it.

I thank you, gentlemen.

DISCUSSION.

Dr. William Bogie, Vincennes: Dr. Zubrod's paper is excellent. It is business-like, and his success is due to the practice of his paper, "The business side of Dentistry." In fact I wish to say, I like his *technic*.

We are all aware our National Dental Association Research Committee can't work such things out for us. As Dr. Zubrod says, we must have back-bone, common sense, and diplomacy. These three are necessary in making this part of our profession a success.

I take no exception to the words money, cost and price. They all enter into our daily life regardless what our work may be. While the jingle of gold or silver has not the true ring of success, they are very essential if we meet our obligations promptly. I also like the idea of an understanding before the dental services are commenced, this eleminates any argument later.

Statements each month has always been my hobby, but never have I been able to collect interest on accounts. Dr. Zubrod does this and he is to be congratulated. If I collected interest, it would have to be like the traveling salesman's weekly expense bill. "The overcoat was there but you didn't see it."

The accompanying card is an excellent addition to the monthly statement and if Dr. Zubrod has no patent, I hope to use it in my practice.

Here is the one thing I differ from Dr. Zubrod. He does not believe in threats or law-suits, he gives them a new rating. I have found in my practice a certain class of patients that a threat like this will accomplish the desired end: "Your account will be placed in hands of attorney for collection if not paid before the tenth of month." Also there are patients who will not pay until a law-suit is actually staring them in the face. This last must be governed by amount of dental bill, and if the patient has property, and not in his wife's name. Both of these methods have increased my bank account and gave me the satisfaction of receiving what was mine. These patients also get a new rating from me.

When any business sustains a loss of less than one per cent. on its earnings, that business is a success.

The society is to be complimented on having as essayist, one who has been so successful in the business side of dentistry and so ably demonstrates the fact in his paper.

G. E. Harter, Toledo, Ohio: One serious objection to the discussion of business subjects by a body of professional men is that insufficient time is allowed in which to thresh matters out to a clear understanding. The result of such incomplete consideration always is misunderstanding, some of the less-professional in the audience being pretty certain to form the idea that the dollar is the most important side of professional life, instead of, by all means, the least important. On account of the utter lack of business training in the colleges, and the consequent ignorance on the part of many dentists, of all that goes to make up business it has been thought wise to emphasize some phases of business life in order that some small part of the curtain that veils the mysteries of business might be raised and at least a glimpse afforded of what lies behind it. Had this not been done, the profession would, by this time, have been full of paupers or bankrupts. So long as living was easy, it may have been possible to keep the wolf from the door and stand off the creditor on twenty-five cent alloy fillings, gratis treatments and cleanings at fifty cents to one dollar; but that time has gone by forever; such prices belonged to the era of ten cent butter and eggs, six cent beefsteak, and twenty-five cent potatoes, and has no place in an age when prices often reach five times those figures and higher.

Undoubtedly, therefore, the emphasis upon the business side of dentistry has had and still has a valuable work to do, and should have a place in such meetings as this. At the same time it would be too bad if from such discussions a cloud should arise that in time might obscure in many minds the professional idea, represented in my mind by the question: "How much can I give for what I get," in distinction with the commercial idea: "How much can I get for the little I give." That there is danger of such a result an incident in my own experience would seem to indicate. A dental friend of mine was complaining, a year or so ago, about his inability to secure a living return for his services, and I undertook to help him. He was then charging fifty cents to one dollar for alloy fillings. I told him to double his prices for such work; to make a reasonable charge for treatments, and to make similar advances all along the line. Expressing his belief that he would not be able to "get away with it," but promising a trial, he left my office, only about half convinced. A month or so later he came to me at a local meeting and beamingly expressed his thanks, stating that his patients seemed willing to pay the advanced fees, and that he was getting along swimmingly.

Now for the sequel: Being frequently asked by my friends to recommend a dentist, I gave his name, among many others, to such an inquirer. I had faith in his skill, and believed his charges to be reasonable. Imagine my surprise and chagrin upon learning that, once started on his "upward" career, the iron of acquisitiveness seemed to have entered his soul, and that he is now charging most exhorbitant fees; cleaning, five dollars; treatment, two fifty; common shell crowns, fifteen dollars; such prices being far beyond the comfortable limit of the class of patients that he was and is serving.

It certainly would be a lamentable result of all of our efforts should we succeed only in making a lot of Shylocks out of the gentlemen of the profession, just at a time, too, when the ideal of Service seems to be getting a firm hold upon the business world. In hundreds of business offices we now can see, printed, cast in bronze, hand-lettered, the motto: "He profits most who serves best."

I certainly agree with Dr. Otto King in the idea that business training should be a fixed part of the college curriculum, and have gone so far as to endeavor to worm such an idea into the professional mind. To a suggestion that such instruction be added to the senior year, the Dean of one of our largest colleges replied: "Why, I, myself, have been giving lectures on business subjects for twenty years; we already have covered that feature!" Now, of all men, the Dean of a dental college, bless him, is the very last to attempt such work, the very nature of his mind, heart, soul unfitting him utterly for it. Until, therefore the necessity for such instruction shall have beaten its way into the college consciousness, there seems no other way than to occupy the valuable time of dental conventions in threshing out these business problems.

Since my talk appears on your program as a "Special Discussion," I have not felt the necessity of confining myself to the subject-matter of Dr. Zubrod's paper, although I intend making some remarks concerning it. I believe that, except in rare cases when the dentist knows that good service is wanted and that the patient knows when it is given and is willing to pay for it, the fee should be named in advance of rendering the service, at least approximately. The patient has a right to know what the fee is to be, and you have the right to know that he knows it and to have a reasonable assurance that it is satisfactory and will be paid. Dr. Zubrod's idea of adding ten per cent. to the probable cost and deducting it later, if possible, is a most excellent one. Tell a man that your fee is to be ten dollars and render a bill for nine dollars and you have gained not only a patient but a friend. If a customer of ours should come into our place and buy a big bill of goods without asking prices, we should very seriously question the worthiness of such a man for credit.

I wonder if all of you caught the significance of Dr. Zubrod's statement that he kept his signs "Terms Cash" in plain sight for his own benefit? It is sometimes well for us to keep near us something that may tend to reinforce our spinal columns.

It is pleasant to hear what our essayist has to say about buying stamps, gold, etc., on time. Judging by the results of our attempts to collect gold accounts with reasonable promptness, it is pretty evident that some of our customers haven't had the "training" that has left Dr. Zubrod in such a satisfactory state of mind in this regard. Some dentists do not seem to realize that in buying gold on time they are borrowing money without interest and without security; but that's just what it amounts to.

We should all commend Dr. Zubrod's habit of mailing statements promptly to all patients on the first of the month. Keep it up. Some of the discussors who have preceded me have taken exceptions to this most commendable business method, some going so far as to say that in rural communities such a course would lose many patients because they are not accustomed to receiving bills and statements until they ask for them. I do not agree with these gentlemen. Send the statements anyhow. If you are the first in your community to introduce this reform in business methods you will live to be commended for it by every other business man and by your patients as well. I have heard of many bad accounts that were made bad by the neglect of the creditor. The time to send bills is when the transaction is new and fresh in both minds. Then is the time to bring out any possible disagreements or misunderstandings, not a year or two later when both have forgotten the details of the transaction. If you do lose a few patients, you will gain others. Your success doesn't depend upon the good-will of a few but upon the prompt and regular payment of fees by the majority of your patients, and I am satisfied that this will be the result everywhere. Surely, you should feel no hesitation or twinges of conscience in asking a patient to pay what is due, while the prompt and regular mailing of statements allows no excuse for a debtor "forgetting," or becoming delinquent. I sometimes think that if dentists were not quite so over-sensitive about receiving statements and requests to pay their own accounts, they would be less so about going after amounts due them. Among business men a man and his business, his money, are two separate matters. A man may like me and dislike my business methods and may tell me that he dislikes them without running the risk of insulting me or getting into a row. Professional men have still considerable to learn in this regard.

I do not agree with Dr. Zubrod that non-ethical or any other sort of dentists are successful just because they happen to make money. Anybody can make money, lots of it, if willing to pay the price. It is my observation that the price of a million dollars is usually one perfectly good human soul, no more and no less. A dentist who is non-ethical professionally is not likely to entertain any very strong ethical sentiments toward his patients or the public. I know one such man who, from a money point of view, is successful; anyhow, he rides in his automobile, and leaves his office daily at 4:30. If that man ever gets his due, he will be ornamented with a coat of tar-and-feathers, ridden on a rail, and deposited in a sewer. No, you don't want that kind of success; neither do I.

Dr. Zubrod does not believe in going to law for redress. I do. That's what law is for. An appeal to the courts is simply an appeal to the public to decide between yourself and a man who tries to wrong you and those dependent upon you. Go after them. If you don't, you are encouraging crooks. If a man is able to "put it over" on one dentist, he isn't likely to pay the next one. Once you have decided that ordinary means of collection are hopeless, inform your debtor that you mean to sue, and then *do it*. You have lost your patient anyhow, and by this course you may help to protect some fellow-dentist, as well as the entire community.

The naming of approximate fee and terms at first sitting, and the collection of a part of the bill at that time, is good, It is a well-known fact that everything is more satisfactory to the purchaser after it is paid for, than before. Manufacturers of machinery insist upon settlement on delivery because, a machine once settled for, has the judgment of the purchaser back of it, and always works better.

Now a word about the young man: He is just the one who does need the money, and he needs something more than that: he needs the discipline that comes from accuracy and obedience to law, whether self-made or otherwise. The young man should at the very start begin to educate himself and his patients by having a frank understanding with them at the first interview. There is no occasion for whining, nor any attempt at working up sympathy. He should say simply and positively that he is just starting, owes a lot of money, and must, in justice to himself and everybody else, limit his credit accommodations as much as possible.

So much for the paper, which I like particularly because Dr. Zubrod wrote it to please himself. By this I understand that he wrote as he felt and as he thought. There are other phases of this great subject that I want to speak about. These will fall under the "Special" part of my discussion.

We have all read a great deal of late upon the method that ought to be employed by dentists in arriving at the cost of their operations. Among the items included in "overhead," or non-productive cost, by most writers on this subject, is one for education. That is, say that the cost of the education of the dentist at college, including the time consumed is three thousand dollars. The idea is to add a certain percentage of this sum to the cost of doing business, so as to wipe it out in a certain number of years. I am wholly out of sympathy with this idea, and for this reason:

I like to think of the world, the solar system and the universe of which they are parts as a living, conscious body, of which each individual man is, in turn, a smaller part, We are cooperative parts and partners in the universe. So far as mankind is concerned, let us consider all the world as making up Society, and that everything in the world belongs to Society as a whole. Now, I am sorry to say that most of us, being the product of the wrong kind of education, consider ourselves not a part of but apart from Society. The ordinary attitude of the individual is: Me, I, Myself on one side, and all of the rest of Society arrayed against me on the other. It is some such notion as this that gave rise to the idea that Society ought to pay for the specific education of Me, I, the Individual, on the basis, I suppose, that the world owes every man a living. Properly understood, with the emphasis in the right place, I agree with that. All that is necessary is to step up to the Cashier's desk and identify oneself as a *man*, and the tools by which that living may be dug out of the psychic soil of the earth will be placed gladly in one's hands. The world, that is, Society, not only recognizes that it owes every man a living, but is quite willing to supply all of the tools—education, training, etc.—at the one sole and simple price of self-identification as a man who has a right to them.

This world is a storehouse of "tools," of knowledge, of wisdom. The mind of Society has entrusted certain work to our colleges. Thousands of years and tens of thousands of generations have been expended in the working out of the net results of the combined experience of the world, of Society, and these net results are deposited in our colleges, the repositories of the accumulated wisdom of the ages.

All values are measurable in terms of time. Money is simply accumulated, condensed time, the essence of time reduced to the form of a circulating medium. Through the colleges we may come into contact with the world's store of knowledge, but we must give value in exchange for it. As the only value is time, we must pay in time, or its condensed essence, money. We are not obliged to go to the colleges for this condensed, essential knowledge. It may be had direct, but it must still be paid for. There is a law of Compensation underlying all human activity that it is useless for anyone to try to avoid. Take my own case: Neither I nor anybody interested in me had command of accumulated time (money) in sufficient amount to pay my way through college. Therefore, I have had to pay for my education in the raw material, time; and, instead of my education costing me only three or four years and a certain amount of condensed time in the form of money, it has cost me fifty years of the raw material of money, time.

I do not think the fact of being born puts the world under any obligation to us; I consider it a privilege to be born, a privilege to be highly esteemed and paid for in service. It also is a privilege to be allowed access to the world's store of knowledge, deposited in our seats of learning. That privilege also must be paid for. Therefore, when our college education is finished, when the tools of our industry or of our profession have been placed in our hands and our heads, Society owes us nothing, while we are still indebted to Society for an immense good that only a long life of service can repay.

We must rid ourselves of the idea of antagonism, of opposition, We are parts of, not apart from Society. We are sustained not by reason of what we do, but by reason of what we are.

We must pay for everything we get, and we pay a price that is determined by ourselves. If we value money more than service, more than anything else, a million dollars will cost us all that we have and all that we are. Indeed many souls have been given for far less than a million.

The ideal of service, the professional ideal, is: "Give as much as I can and let the getting take care of itself," rather than the commercial ideal: "Get as much as you can for the least possible giving," This is what Dr. King means when he insists so strongly for the better individual dentist; and this is why he protests against the introduction of business subjects upon the floor of our conventions.

Those who are ready and willing to do their best work without thinking of reward, recompense, are *sure*, in the long run, to get the most. The dean of the faculty of a medical college, has told me more than once that not one student ever left his college, in forty years, bearing the commercial ideal with reference to the practice of medicine and made either a professional or financial success; and that those were most successful who regarded their professional oath of service with the most solemnity. Everything that we get must be paid for in some way. There are no such things as gifts. The man who attempts to commercialize a profession is attempting to get without giving.

It is for these reasons and reasons like these, that I agree with Dr. Zubrod in another matter: He says he is not presuming to tell you how to sell your services; and I am much less interested in that phase of the situation than in the other and to me more important one: The taking care of your money after it is earned. High fees are in too many cases obtained at far too high a cost—the cost of character, of self-respect. I firmly believe that he who renders service will be adequately compensated. The matter of compensation has not been the only nor the chief trouble with the dentist. Usually the trouble is, as Dr. King has said, that he doesn't know how to take care of his money after he gets it. To the thorough education of the dentist along this line, I am willing to give all of the time and energy that I have to spare. Sometime I hope to meet all of you, when time is not so limited, and go into these matters in a manner that will be useful and helpful to you. For the present, all I have time for is to most heartily commend the paper, and to add my O.K. to all that has been said by the various discussors. Out of so much some little good is sure to come.

Before closing I would like to say that I have been attending conventions for the past eight years, that this is one of the best, and that I have enjoyed my visit here very much. I predict for this society a most successful career.

AMALGAM*

BY DR. C. A. PRIEST, MARION, INDIANS

The first thing to be considered with amalgam, the same as any other material, is the foundation upon which to build.

Therefore, we must consider the cavity and prepare that cavity in a way that we are sure of a solid foundation. To do this you must cut away all thin enamel walls that are not supported by good strong dentin, and prepare the cavity the same as you would for a gold filling, with two exceptions: First, you must not bevel the marginal edge of the cavity, as a thin-edge of amalgam is liable to chip. Second, the undercut for the anchorage must be a little broader than for gold, thereby helping to pervent the flow of the amalgam.

If all of the crown of the tooth is weak, cut it down to the gum line or below if necessary. But in such cases do not depend upon slight undercurs to hold the filling in place, but set posts in the nerve canals and then build the filling around them.

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*Clinic Northern Indiana Dental Society.

Always keep in mind that the life of our fillings greatly depends upon the kind of a foundation we have built upon, and here I might state that it is best to build upon good solid tooth structure rather than upon gutta percha or cement.

Put just as little gutta percha or cement in a tooth as possible and we all know it is possible to pur very little.

Amalgam being a plastic material, it is necessary to have a four-walled cavity within which to build, as it is impossible to condense amalgam as it should be without wall resistance. To have a four-wall cavity it is quite often necessary to use a matrix, and this matrix must be made to fit, especially in the interproximal space where it is impossible to see to trim the filling after it is placed. For you must never leave any overhanging margins if you want your fillings to give good service.

In preparing the amalgam be sure that it is thoroughly amalgamated, and to do this it takes something more than merely mixing between thumb and finger. You must use the mortar and pestle and beat it thoroughly to obtain an amalgamation of the alloy, rather than a mix.

Always be sure not to use too much mercury, for if too much mercury is used in an expanding alloy, it causes an increased amount of expansion of that alloy. And if too much mercury is used in a shrinking alloy, it will cause an increased amount of shrinkage of that alloy. It is never safe to guess at the amount of mercury to use with a given alloy. The only safe way is to weigh the alloy and mercury in the proper proportions as stated by the manufacturer of the alloy used. The manufacturers of the alloys will gladly furnish you with the proper proportions to use.

In placing the filling use the same kind of pressure as you would in placing a gold filling—at least fifteen pounds' pressure. Build the cavity more than full, then remove the matrix and carve the filling to reproduce all cusps and grooves; and by spending a little extra time you can obtain an occlusion as good as if you were carving in wax for a gold inlay. Where amalgam is indicated, you have a much better filling than you could possibly obtain with any other material.

Regardless of what lind of a filling material you are going to use, be sure that you use the one indicated in that particular cavity. If you use the one that is indicated you will often have to use amalgam, and when you do use it, be sure that you use it correctly and spend the time necessary to make it a good filling, and then charge for service rendered.

> A very great part of the disputes in the world come from our having a very keen feeling of our own troubles, and a very dull feeling for our neighbors; for, if the case were reversed, and our neighbor's condition became ours, ten to one our judgment would be reversed likewise. —*George Macdonald.*

THE TREATMENT OF PYORRHEA.*

BY J. P. CARMICHAEL, D.D.S., MILWAUKEE, WIS.

AN INVITATION to be a guest of your society and to participate in the discussion of a subject of as great importance as the one which you have selected for consideration this evening, is rated by me as a pleasant and agreeable task.

The disease known as Pyorrhea Alveolaris is the problem of our day and age, yet so comparatively recent is its recognition and so notoriously unavailing its treatment, that no one disease has earned for itself greater diversity of opinion as regards its nature, prevalence, etiology and treatment than has this one condition, and a cursory glance dealing with the literature on this subject convinces the most casual observer of the accuracy of this statement.

I do not believe this disease to be a local manifestation of a systemic disturbance, but I regard it as a purely local process merely favored in its existence by systemic debilitation. When pyorrhea is once established in its chronic form it exerts a doubly detrimental force on the general bodily health. The continuous and protracted production of the quantity of pus daily cast off from the deep-seated wide-spread case of purulent alveolitis must be an enormously debilitating factor on nature's protective forces. In addition, the ingestion or absorption of this highly toxic matter is accountable for the long train of systemic disturbances commonly noted in connection with this morbid process. This view is being quite generally subscribed to by leading men in the medical profession and, considering pyorrhea in the light of its being purely a local infectious process, we not only confer upon this disease its proper dignity, but in addition we are taking a rational and practical scientific attitude as our guide for its treatment.

With the evolution of modern dentistry have come many new laboratory findings upon which I do not profess a most thorough techincal knowledge, and I am only relieved from the embarrassment thus occasioned by remembering that, what concerns you and me most in our daily practice of dentistry is the clinical findings and the methods of successfully meeting them.

Less than one year ago the attention of the dental profession was directed to a discovery made by Doctors Barrett and Smith, in which the specific cause of pyorrhea was attributed to the Amoebae Buccalis, a parasite which according to their findings, was invariably associated with the disease. Accordingly other investigators instituted a search for this same parasite and there followed voluminous literature dealing on the subject. Doctors Evans and Middleton of the University of Wisconsin, have contributed to the Journal of American Medical Association, an interesting report of the result of clinical research work done along the same line and it is the subject of other papers in various medical publications.

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*Read before the Miami Valley, Ohio, Dental Society, 1915.

Immediately following the discovery and publication of the supposed role played by this organism, wide spread enthusiasm greeted the emetine hydrochloride treatment, which was at that time claimed to be the specific treatment for this disease. For a few months after these assuring promises, the literature was found teeming with further evidence in favor of that particular line of treatment. From the standpoint of the clinician, who has studied carefully the disease process in all its various forms and phases, the highly extolled virtues of the emetine treatment seemed to be not wholly rational, for the reason that, though the EntameobaeBuccalis may be the chief organism in the causation of pyorrhea, it is not the only organism which we have to deal with, and which would not be eliminated by emetine hydrochloride.

It is a widely accepted fact that the mouth normally contains a great variety of pathogenic organisms, most virulent among which are the Streptococcus, Staphylococcus and Pneumococcus, and without laboratory experimentation we have long felt convinced that they played no small part in this diseased process and recent research work has proven that we were not amiss in our speculation. This being true it must be conceded that any line of treatment which fails to take cognizance of their presence and is not aimed specifically at their elimination must prove a failure.

In this view we feel well borne out, not only from laboratory but clinical observation, for it is a well known fact that many constitutional diseases due to a specific micro-organism are immediately and directly traceable to a condition of pyorrhea. The medical profession has given an almost universal recognition to this idea and it has been extensively written on under the caption of focal infection. The two leading diseases to which our interest earnestly lends itself are acute articular rheumatism and endocarditis. Now both of these diseases are definitely known to be due to some form of a streptococcic infection and are frequently found in association with pyorrhea, the focus at which the streptococci enter the circulation. Similarly many other infectious diseases of obscure origin are now satisfactorily proven to be due to pyorrhea, and with this view point the urgent necessity of clearing up diseases in the mouth becomes strikingly urgent. So then, we are all concerned in the successful treatment of this disease.

Probably no one other item accounts more for the frequent failure than the ordinary practitioner not bearing in mind the various indications to be met with in the treatment of this disease. For the sake of clearness I shall outline very briefly the points to be kept in mind in carrying out any line of treatment:

First: Clear away all infectious matter and dead tissue, doing as little injury to living structures as possible.

Second: Induce an active circulation in the parts involved.

Third: Prevent re-infection of the diseased parts during process of healing.

Fourth: Apply those preventive measures that will enable the teeth to ward off foreign matter.

In discussing those various measures employed to meet the indications outlined above, it must be borne in mind that they are to be carried on conjointly and dovetailing one with the other throughout the course of treatment.

We all have our ideas concerning hard deposits, and the methods employed in their removal are so varied that it seems we have lost view of the points to be borne in mind. It matters little what measures we employ providing we thoroughly remove them without doing injury to the peridental membrane. On the contrary, the soft deposits including all forms of clinging, putrescent matter have received altogether too little attention, and to my mind they are the real offenders from which all infection about the teeth takes origin. Hence we should give far greater attention to the removal of these essential elements in the cure of the disease.

It has been my custom before attempting the removal of the hard deposits to entirely rid the teeth and gums of the soft deposits adherent thereto. My reason for so doing is founded on the belief that the injury done incidental to the removal of hard deposits breaks down the leucocytic wall of defense about the infected area, permitting the infection to advance farther and farther into the healthy tissue.

For the removal of those soft deposits, my first step is to prescribe for the patient a preparation that will clean away and cut free the soft clinging matter that is causing the infection. The next few days will show a marked improvement in the inflamed gums and instrumentation may then be conducted with a fair degree of impunity. However, so long as the inflammation of the gum remains, there will be thrown out an exudate that gathers infectious matter from which the teeth should be kept free until the inflammation in the gum has subsided.

From the beginning to the end, the pyorrhea process is accompanied by a static condition of the circulation locally, and as a result the defensive forces of the parts are proportionately weakened. It naturally follows that infection which has found its way into the deep tissue, must be eliminated by the circulation, and to accomplish this a deep-seated hyperemia must be established.

In my experience the compound oxygen vapor treatment accomplishes this in a measure never before equalled. This treatment was introduced by Dr. Dunlop about five years ago and has proven of great value in the elimination of deep-seated infections.

It should be borne in mind that the infection in and about the alveolar process may not be controlled alone by the circulation however active, if the area be left open to re-infection. The entrance of organisms into the tissues from without must be prevented as in the case of infection elsewhere in the body. Sterile bandages are applied in instances of infection on surfaces of the body, but here, the wounded and inflamed gum tissue is left wide open to re-infection by organisms ever present in the oral cavity. Of course, bandages may not be used in the mouth, but it is a very simple matter to protect the diseased gums and pyorrhea pockets from re-infection by carefully sealing them over with a preparation of medicated paraffine, which here takes the same position of service as the use of collodion in puncture wounds on the body surface. I have found this treatment very helpful in clearing up the infections. This dressing requires to be changed daily and with a little instruction the patient may be taught to apply it at home.

Of course, the success in pyorrhea treatment will depend very largely upon the prophylactic measures adopted. No matter what the measures may be in the cure of pyorrhea, if the condition that produced the disease originally remains, the disease is quite likely to recur, and for this reason painstaking prophylactic measures are urgently recommended. Though this fact has been widely accepted as true, in my opinion more error and therefore greater cause for failure lies in the prophylactic measures adopted rather than in the methods employed in actually treating the disease.

We cannot possibly remove the infectious matter that constantly accumulates beneath the loose inflamed gum margin and between the teeth by the ordinary means of a tooth brush, and to apply tooth powders and pastes will deposit a residue that adds a culture media to the already infected area. The sweet gelatinous material in tooth pastes when once dissipated of their antiseptic properties by the fluids of the mouth, becomes an ideal culture bed for bacteria. We thus lend aid to the infectious process we are trying to prevent, for these same substances left behind after the use of a paste, may for all practical purposes be considered as a culture media. Under these conditions the inflammatory and diseased processes are aggravated and no mouth wash here applied is sufficiently penetrating to destroy any except the most superficial organisms, and much less capable are they of washing away the sticky deposits. This fact received a wide recognition and an effort was made to get rid of its objectionable features by the use of inorganic preparations such as powdered pumice stone which is commonly found in all tooth preparations today. True when pure pumice is applied as a cleaner it leaves no such objectionable residue behind, but what it does do and which is worse, it leaves the enamel so scarified and roughened that the teeth are in a worse condition than before its use, for in this scarified condition infectious matter more readily adheres, stains more easily penetrate the tooth texture and the natural luster has been destroyed.

I can hardly understand how our predecessors came to advise the use of sharp gritty substances for cleaning the teeth. The best-kept sets of teeth among elderly people whom I have met, came from rubbing them with a cloth and the friction thus provided seems to be more effective in removing the soft, clinging deposits from the teeth and gums, increasing the brilliancy of the teeth and providing a normal and natural massage for the gums.

In the texture of a tooth we find a certain amount of viscosity, a property which prevents perfect freedom of vibration and which ultimately converts vibration into heat, which is due to a lack of mobility but possessing a quality of changing its form under the influence of a deforming force.

If we bathe a tooth in lactic acid it undergoes a marked change in texture. If we eat certain acid fruits the enamel will appear soft and sticky. This yielding surface of a tooth permits a drawing together of its texture which might be compared to a burnished surface on metal. In other words when subjected to a physical burnishing it yields to a degree that all porosity is closed. The worn occluding surfaces of teeth will show a condensed highly lustrous surface not only capable or resisting the absorption of stains, but like burnished metal becomes hardened by attrition.

By applying friction to the exposed dentin an almost impervious surface is developed that will shut out external influences upon the pulp.

Therefore if we would maintain the teeth in their natural lustrous condition we must abandon the use of crystalline grit in any form.

An extracted tooth can be made smooth by a fine abrasive and then polished by an impalpable friction powder until it becomes so slick and slippery to the feel that it is with difficulty held in the fingers.

It is a demonstratable fact that the tooth surface may be kept smooth and lustrous by a dry friction rub without any appreciable loss of enamel substance, and this is nature's way of maintaining that state of brilliancy in which the tooth effectively wards off disease. To maintain and enhance the natural brilliancy of a tooth requires the use of an impalpable powder possessing a peculiar quality of resistance that makes it capable of polishing the enamel of teeth.

In order to use a friction powder and apply it to the teeth dry, suggested the idea of the Tooth Napkin, which is a small muslin square, with a friction powder incorporated in the cloth, ready for use.

The patient's first impression when offered the tooth napkin that is, a tooth brush will remove matter from between the teeth much better than they will be able to do with the tooth napkin. However a demonstration of the many ways in which this tooth napkin can be used is convincing of its superiority over that of any other means of caring for the teeth. This method is most pleasing to children who object to the tooth brush upon their tender gums.

For polishing between the teeth and beneath the loose gum margin there is untold value in using a tape charged with a friction powder. The flat tape can be carried entirely around the tooth, drawing same beneath the loose gum tissue, which provides a means of removing infectious matter that cannot be reached by any other means. Waxed floss is inefficient; although it removes the loose particles of food, it will not take off the sticky deposits.

In conclusion I will summarize briefly by saying that while the cure of pyorrhea has been definitely demonstrated, the permanency of the cure depends very largely on the nature and extent to which prophylactic measures are adopted in an effort to prevent its recurrence. Unless these preventative measures are used and the patient instructed in the proper care of the teeth a recurrence of the disease is almost inevitable.

The preventative measures I have found to be most effective is to polish the tooth surface so highly that with reasonable care the possibility of the collection of even the soft deposits is entirely eliminated.

The reasonable care on the part of the patient to keep this high luster on the teeth is by avoidance of sweet, sticky pastes and powders and the polishing of the teeth with a cloth permeated with a friction powder free from grit and the use of a dental tape permeated with the same material.

I consider the average tooth paste furnishes an ideal culture bed for bacterial development in the residue it leaves behind, and when one considers the matter it is curious that the increased prevalence in pyorrhea keeps well abreast with the increased use of tooth paste.

615 Wells Bldg.

FIRST UNIVERSITY DENTAL SCHOOL IN NEW YORK FOR COLUMBIA.

DENTAL COURSE TO BE ALLIED WITH COLLEGE OF PHYSICIANS AND SURGEONS.

Realizing the importance of the teeth and mouth infections to systemic disease, the Faculty of the College of Physicians and Surgeons have unanimously voted in favor of the establishment of a dental department, to be connected with the medical school. A committee of prominent dentists of the city have presented plans to the Medical Faculty which have been approved.

The school of dentistry will be closely associated with the medical school and the admission requirements will be the same as the medical. The course will be four years, the first two years the same as those in medicine, thus giving the dental student a thorough knowledge of the fundamental sciences necessary to the practice of a specialty of medicine. At the end of the second year the dental student will give all his time to the study of dental subjects, namely: Operative dentistry, prosthetic dentistry, oral surgery and oral pathology, orthodontia etc., and the more technical part of the work required for the well trained dental surgeon. This new school will be the first university dental school in New York City and the second in the State. It will give the first four year course of dentistry ever given in the Empire State.

THE OPPORTUNITY OF THE DENTIST IN CONNECTION WITH CANCER*

BY HERMANN B. GESSNER, M.D., NEW ORLEANS, LA.

I WISH TO EXPRESS to you my appreciation of the invitation to appear before you on this occasion. Early in my professional life I was brought into close contact with the practitioners of your specialty in connection with its educational side. Through this association and the friendships which developed from it, I have come to take a deep interest in your work. What thinking I have done concerning it has led me to believe and to declare on every appropriate occasion that the education of the stomatologist or mouth specialist should be conducted along the lines which are followed in the preparation of other specialists. Those making a specialty of diseases of the eye, of the ear, nose and throat, of the skin, of the genito-urinary organs, of the bones and joints, of the nervous system, are given a general medical education, at the conclusion of which they take up the special study of the particular branch to which they purpose devoting themselves. I know that objections to this are urged on the ground that the oral specialist must acquire early the manual dexterity that is so important to his patients. I shall not discuss the subject beyond saying that if you who are the leaders in such matters conclude that the plan as a whole is good, means can be found for meeting the objections and correcting any minor faults that present themselves. In explanation of my introduction of this subject on the present occasion, let me say that I believe that this more thorough preparation of the student for his lifework, along general medical lines, would have as one of its advantages the better appreciation of the non-mechanical problems of dentistry, among these the problem of cancer of the buccal cavity. Two years of contact with disease in all its forms, during the junior and senior sessions, would lay a foundation of value for the proper understanding of the bearing of general facts on the special conditions found in the mouth.

Cancer is a disease of civilization. The late Nicholas Senn, of Chicago, one of the princes of the profession in his day, in an extensive tour of the world, found cancer rare or non-existent in the uncivilized. Where not controlled by special activity, it shows a tendency to increase. The following figures from the U. S. Census Bureau show a steady increase in the mortality from buccal and other forms of cancer in this country during the years 1910–13:

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*Read before the Louisiana State Dental Society 1915.

DEATH RATE PER 100,000 FROM CANCER.

	Death rate per 100,000 population.			
Year	1913	1912	1911	1910
Cancer and other malignant tumors, (total)	78.9	77.0	74.3	76.2
Of the buccal cavity	3.1	3.0	2.9	2.9
Of the stomach and liver	31.2	30.6	29.3	30.6
Of the peritoneum, intestines, rectum	10.5	9.8	9.8	9.8
Of the female genital organs	12.2	11.7	11.3	11.4
Of the breast	7.3	7.3	7.2	6.9
Of the skin	2.7	2.9	2.7	2.7
Of other organs or of organs not specified	11.9	11.6	11.0	11.9

By these figures, an increase of nearly 6.9% for buccal cancer in three years is shown.

As you know, the exact etiology of cancer is still in doubt. Some believe in its parasitic origin, others stress the part played by misplaced embryologic rests. One thing generally admitted is that traumatisms and irritations constitute an important factor in the causation of cancer. The irritation of lip and tongue by smoking, of cheek and tongue by shells of teeth, are instances connected with the buccal cavity. In the Philippines is observed a cheek cancer due to chewing a mixture called buyo, the ingredients of which are tobacco, betel-nut, bay leaves and slaked lime. Cancer of the cervix is frequently traced to laceration in child-birth, with the formation of a heavy scar. Bone sarcoma from repeated traumatisms is a well established observation. In this connection, it is interesting to note that fractures are rarely followed by malignant growths, though bone trauma not sufficient to cause fracture, especially repeated trauma, is believed to cause these neoplasms. I venture to suggest that while the usually single, unrepeated character of the trauma may explain this freedom of fracture from the sequela of neoplasm, it may be that the breaking open of the marrow cavity liberates cells whose activity is unfavorable to new and abnormal growth.

Surgeons in general accept the theory that trauma and irritation are factors in the production of neoplasms. Dr. J. C. Bloodgood, of Baltimore, who deserves the deep gratitude of humankind for his activity in the war against cancer, the initiation of which was largely due to his efforts, states that in skin and mucous membranes cancer is practically always found to have had its origin in some abnormal tissue. He uses the word "precancerous" in this connection, urging that if all cancers-to-be were operated on in this stage, the per cent. of cures would be 100, instead of far less as at present. It is here that the dentist can render valuable services, by early diagnosis and early treatment or reference to properly trained men. The dental practitioner, who often is the first professional man to see the case, may in his first examination note any moles, warts, or wens about the face; he will, of course, in a careful, methodical survey of the patient's oral cavity, note the lips, cheeks, gums, palate, tongue, floor of mouth as well as any deformities of the maxilla or mandible. In this connection, it may not be uninteresting to review briefly the signs of malignancy as stressed today. Twenty years ago, infiltration (including that of lymph nodes), metastasis, cachexia, recurrence, ulceration of solid growths, rapidity of growth, were given as signs of cancer. Today we look upon recurrence, metastasis, cachexia, and ulceration of solid growths as *too late* signs; infiltration of neighboring tissues is looked upon as late and may easily be too late if the lymph nodes are extensively involved. Especially noteworthy is the discarding of pain in the diagnosis of malignancy. Bryan, of Nashville, was among the first to bring out the fact that pain is frequently absent until late in the disease and is therefore not to be relied on for early diagnosis.

The history of the case (age, exposure to trauma, course of the growth with special reference to rapidity of growth), and the use of laboratory help such as the X-ray and pathologic examination of the growth while the patient lies on the operating table, both by macroscopic section and by frozen microscopic section, must be our early means of diagnosis.

The modern surgical attitude towards tumors is illustrated by this case: A woman of 54 comes to the surgeon complaining of a swelling and discomfort in the left breast following trauma, this inflicted by the foot of a child who was her bed-fellow (3 months before). Considering the frequency of malignant growths in the breast, especially at her age, the history of trauma without fever or pus production and the hardness of the mass, a diagnosis "suspicious of cancer" is made on the spot. At this time there is no adhesion of the skin to the tumor to show infiltration, the nipple is not retracted, no ulceration has taken place, the axillary lymph nodes are not palpable, there is no cachexia nor metastasis. Under light (N_2O+O) anesthesia with ¼% novocain cum adrenalin (1-100,000) by infiltration, the mass is removed, is sectioned for a macroscopic view and passed on to the pathologist for a frozen section. If the macroscopic and the microscopic appearances show cancer, as in the case I have in mind, the breast and overlying skin, with underlying fasciae, pectoralis muscles, axillary contents, are swept clear away en bloc with excellent prospects of cure, which means freedom from recurrence or metastasis five years later. If the growth proves innocent, its bare removal is sufficient.

I do not recommend the removal of a portion of the growth for examination before operation, because this removal, if not promptly followed by operation, may cause dissemination with increased rapidity, and because the portion removed may not be truly representative of the entire mass. In connection with dissemination it is interesting to note the more frequent removal of malignant tissues by means of the cautery, which seals lymph and bloodvessels and perhaps exercises a sterilizing influence for some distance beyond its line of application.

Supposing that the examination made by the dentist establishes strong presumptive evidence of cancer or precancer, what shall be his course? I believe that in the great majority of cases he will find it advantageous to refer the case to one who sees more cancer than he does and who is more accustomed to operative procedures. This is the day of teamwork in the medical profession. Fractures about the jaws require the combined efforts of surgeon and dentist to produce the best results. So with cancer, where recognized or suspected by one of less experience, his more experienced colleague should be called in to confirm the diagnosis, advise as to the indication, and apply special treatment.

To sum up, the dentist will best use his opportunity in connection with cancer by doing these things:

First: Taking a four-year course along the lines pursued in medical colleges, with special training introduced to meet his needs.

Second: Practicing methodical examination of patients over skin and mucous surfaces, with cancer borne in mind.

Third: Holding consultations with the surgeon as to any suspicious lesion.

THE EMETINE ERROR*

BY JULES J. SARRAZIN, D.D.S., NEW ORLEANS, LA.

DURING THE LATTER PART OF AUGUST, or the beginning of September, 1914, without reference to the previous labors of Chiavaro, Barrett and Smith, in the same field, the New Orleans morning and afternoon papers were aglow with a specific treatment for Riggs' Disease based on amebic etiology, promising magic results. Some weight to this rosy outlook was given by interviews with reporters which were published. My first impluse was to hold back judgment, expecting such public newspaper talks to be disclaimed as not being authorized, even though the amebic etiology and treatment were affirmed, which at that time seemed rather doubtful on the lines of utter disregard for infected cementum and carious bone set forth. However, on September 14, 1914, at a meeting of the Orleans Parish Medical Society, the amebic etiology and therapy were brought out on lines quite identical with the above mentioned newspaper articles.

Not having yet made any tests, but being strongly impressed by the well known systemic factors and local etiology of Riggs' Disease, believing that a sincere but dangerous error was being promulgated, I then limited myself to pointing to it in broad terms, cautioning against a blind and free use of the treatment before its value was established.

On October 26, again at a meeting of the Orleans Parish Medical Society, the emetine-ipecac treatment was presented, based on some two hundred cases successfully treated, the *Ameba buccalis* being the criminal, its ingress being explained in most cases by toothpick injuries to gingival tissue. I fully agreed that the deleterious results following toothpick traumatism rendered it an undesirable instrument in usual mouth conditions, but I also pointed out that the toothpick amebic etiology was unnecessary to Riggs' Disease, because inspissated mucus on teeth necks, charged with dead epithelial cells and infectious bacteria, furnish the local part of the etiology by themselves, aggravated by irritation from lime salt deposits when present, while the resistance of tissues was lowered by the usual dystrophic atrophy of the human maxillary and mandibular structures. I had by that time been testing the emetine-ipecac treatment, and stated my results. Tumefied, bleedy gums, in habitually neglected mouths had markedly improved as a result of removing salivary calculi and brushing away a part of the septic films off teeth necks. Results from mouth hygiene are generous beyond the proportion of its thoroughness, although perfect results come from perfect technic only. Fluid extract of ipecac, or even plain water, would benefit tissues habitually infected by filth; the patient's attention having been drawn to mouth cleansing, it being done a little more and better than usual. I also reported at the same time that in no case of loose teeth, or suppurating pockets, or carious alveoli, had I seen any objective improvement from the ipecac-emetine treatment. Discomfort to patients from such teeth usually lessens as any treatment is instituted. This implies no real change of conditions, and, as time demonstrates, no cure. Of course, I had abstained from any systemic measure other than emetine hypodermics, and locally from going beyond the removal of chunky deposits off roots. I was testing the amebic-emetine-ipecac treatment clinically. In some of those cases hypodermics of emetine had been given for six consecutive days, followed by weekly injections, doses ranging from 2-3 gr. to 1 gr., while ipecac was irrigated in fundi of all pockets and used on the tooth brush, with no real improvement in over five weeks.

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*Read before the Louisiana State Dental Society, 1915.

On October 28, at a meeting of the 1st and 2nd Districts of the Louisiana State Dental Society, the amebic theory merged with the infective mucus film etiology I had mentioned two days earlier, instead of the amebae being considered independently. Since amebae feed off the protein molecule broken up by infectious bacteria, it was unquestionably proper to locate them in inspissated mucus films which supply the true etiology of Riggs' Disease. Bacteriologists are generally agreed that *Amebae buccalis* have no pathological significance, and feed as just mentioned, while, on the other hand, the *Ameba histolytica* of Schaudinn and Craig, and the *A. tetragena* of Hartmann and Vierick are tissue burrowers. Actual penetration deep into tissues should not be confused with compression between diseased cells at the surface or fundi of pyorrheal lesions, which are being disintegrated as they succumb to infection, and between which a microscopic protoplasmic mass will readily imbed itself.

The amebic etiology has just recently gone into still another phase, making the *Ameba buccalis* the carrier of pathogenic germs into the walls of alveolar pockets. Since laboratory experiments upon autolized tissue, amebae in symbiosis with infectious bacteria, show the former throwing off the latter after feeding on the protein molecule freed by them, it is quite devoid of any surprise that pathogenic bacteria should be present on *Ameba buccalis.* For a few infectious bacteria thus located, there would be myriads of them independently diseasing soft tissues, the leukocytes of which are neither numerous nor active enough to destroy them as rapidly as they gain entrance. If we bore in mind that Riggs' Disease requires two causes to produce its suppurative stage, we would be less easily disturbed by any unproven etiology ascribed to it. The dystrophic atrophy of alveolar tissues, due as much to the fact that arterial blood must be pumped upwards to them as to their being transitory structures, explains why the suppurative process easily results from adjacent infectious cervical films or deposits. We there have the predisposing, or less resistant, systemic condition and the determining local factor. Under favorable conditions the latter is resisted by the former. Again, in the absence of local infection, but with destruction of alveoli due to insufficient blood nourishment, teeth sometimes become lost from lack of support. With these facts in view, any restricted local etiology becomes puerile.

Dr. Anna Williams, of the Park Laboratory of the New York Board of Health, has just been conducting a series of tests where *Amebae buccalis* have been found in school children's mouths, as follows:

Healthy gums	30%
Healthy gums with carious teeth	50%
Calculi and receding gums	84%
Tumefied, bleedy gums	94%

Amebae are so widely distributed in nature that no surprise need result. As we are not wont to expect Riggs' Disease in the mouths of children, these investigations rather point to the increased presence of amebae in more luscious pasture grounds, as a result of favorable conditions for their nourishment, but not as a cause of disease.

There is here no intention to question the destruction of *Ameba buccalis* by emetine or ipecac. This is quite beyond doubt. On the other hand, there is strong reason to believe that these amebae are unjustly accused of producing conditions they only enjoy, that the health of innocent victims is being threatened by strepto- and staphylococci allowed to carry on infection while amebacides constitute treatment. Unquestionably, it would seem desirable to sound that warning as loudly in the public's ear as was the sincere but misleading theory of amebic etiology. It would be far better for some teeth to be speedily sacrificed than to jeopardize health by maintaining dangerous foci of infection.

All the successive negative amebic treatment results which I have seen, have for some time convinced me that the amebic etiology belongs to that large class of theories which may only be applied with caution before conclusive tests are made, and I regret it sincerely, first, because I have faith in the sincerity of the men who have devoted great energy and time to these original researches, and second, because hope for a rapid and easy cure seems blasted, which would have been a boom to humanity. Alone, one test could outweigh painstaking, thorough, clinical evidence based on intimate knowledge of Riggs' Disease pathology. This would be the production of the suppurative disease in the mouth of a fairly healthy subject affected with superficial gingivitis, dental chair and home oral prophylaxis being perfectly carried out, while, following the latter nightly, at bedtime, gingival margins would be generously smeared with a pure culture of *Ameba buccalis.* Such a test would carry weight if conducted with flawless details. Considering that cultures of amebae on autolized tissue are not infrequent laboratory technic such cultures should be accessible.

Whenever iodin is painted on gums, or any germicidal solution used thereon, or in pockets, other than emetine or ipecac, a reliable factor is brought in the treatment which destroys micro-organisms other than amebae, producing results due to reaching the correct etiology of the disease. Improved conditions resulting should not then be credited to the emetine-ipecac treatment. A mouth wash containing iodin will also be similarly misleading if used in connection with the amebic treatment. Likewise, the so-called "planeing" of roots removes material infected by germs other than amebae, and must also be avoided in testing the merits of the emetine treatment.

A factor which sometimes misleads experimentation with emetine hydrochlorid is that it is mildly germicidal to pathogenic germs such as strepto- and staphylococci, and it is hemostatic.

Since the "End"-*Amebae buccalis* do not carry infectious germs far beyond necrotic areas, but are present in the disintegrating walls and at the fundi of pockets filled with pus, and bounded by carious bone and infected cementum, it is reasonable to deduct that emetine hypodermics, or ipecac per os, while they destroy amebae, and may serve to lessen the danger of systemic infection, play little part in inhibiting micro-organic growth inside Riggs' pockets, where, of course, no blood circulates. Quite similarly, vaccins may exert a favorable influence on systemic morbid manifestations resulting from infection by germs identical with those composing the vaccin but, owing to the fact that no blood circulates through the pockets of suppurative Riggs' Disease, it is idle to expect that either these pockets themselves, or their contents, may be affected by such hypodermic injections. It is what is done locally and directly into the pockets themselves, which is the beneficial procedure in both instances. Therefore, irrigating pyorrheal pockets with emetine or ipecac, owing to a weak germicidal action, will lessen, without completely checking the pus exudate in chronic cases. This diminution is more marked after irrigating pockets for the first time than at any subsequent repetition, simply because pus does not accumulate as thickly in such lesions, in twenty-four or forty-eight hours, as in the preceding months during which treatment was either completely omitted or done haphazardly. In other words, due to far greater germicidal power to truly pathogenic micro-organisms, if a solution of iodin crystals had been substituted for topical use, the control of suppuration would have been far greater, although not complete without the removal of local infectious and irritating factors, backed by adequate systemic measures where indicated.

Again, it may be understood easily why results misleading and deceptive to the casual, inexperienced, or superficial observer of Riggs' Disease conditions, may occur, in the acute stages, under emetine-ipecac treatment, before old chronic pus pockets have existed. There yet being no such pus pockets on roots, the topical use of ipecac inhibits the surface growth of strepto- and staphylococci, while blood hypodermically charged with emetine protects the gums it permeates. Add the hemostatic action of emetine and the usual fact of more and better mouth hygiene having just been instituted, and gingival conditions would inevitably improve before the formation of pus pockets.

The local role played in the production of Riggs' Disease by inspissated mucus, bacterial, cervical plaques is so plain to students of that etiology (the adjacent tissues succumbing to that infection), frequently coupled as it is with irritation from hard deposits, and habitually in the presence of dystrophic tissue atrophy, that it seems puerile to trained Riggs' observers to conjure innocent non-pathogenic amebae to cause lesions they only inhabit to feed therein, and the pathology of which does not suggest their concurrence.

Since it has recently become common routine medical practice to treat Riggs' Disease hypodermically, or by mouth only, it would behoove the dentist as well to announce a specific treatment for a systematic disease, the phases of and therapy for which he knows not, except from hearsay of medical practitioners with limited special experience therewith, and to them loudly herald his new system of treatment before its being thoroughly tested in professional circles. Results from such well-meaning errors are rendered harmful in proportion to the weight of authority which sincerely promulgates them, countless healths and lives being threatened by septic oral conditions, which should have been corrected; in many cases extraction being far preferable to their continuance. The gravity of the situation is increased by local directions for mouth hygiene being given by some physicans in connection with the new specific emetine treatment, which disregard the fundamental etiology of infectious bacterial plaques on proximal teeth necks, advising brushing teeth without stimulating gingival circulation, and without even passing floss between them. Indeed, there would be vastly more oral prophylaxis in discarding the tooth brush entirely, but insisting instead on thoroughly rubbing a minute flat tape on all proximal teeth faces and necks, mesial and distal, and employing a clean rag to break up thickened mucus films on all exposed dental surfaces, even though gingival stimulation, along with other well established and proven oral prophylactic measures, which rest on the combined experience of experts in that line, was discarded by medical men in assuming the role of mouth hygienists. Discarding the tooth brush might even appeal to a few sensational dentists who accuse it of being a carrier of infection. Of course, if ten or one hundred surgically clean brushes sweep in as many filthy, septic mouths, and later, after a thorough rinsing in cold water and drying (which inhibit bacterial growth), are used to inoculate culture tubes, an abundant growth of pathogenic germs must surely result. Conclusions drawn from such a procedure are strikingly unscientific because they take no account of the fact that vastly more infectious material will have been removed from the mouth than can possibly be left in the brush, because they do not duplicate conditions which obtain when truly germicidal dentifrices are employed, and because, even as mouth infection is reduced by repeated brushings, it will continue to remain so far in excess of that in the brush as to render the latter insignificant.

The experience of Dr. Eugene S. Talbot with strong solutions of iodin in oral therapy at once sets at rest the claim that germicides may not be employed on the oral mucosa which are capable of destroying infectious bacteria in the mouth. Dentists who entertain a sentimental or sensational fear of the tooth brush would act more wisely by advising its immersion in an aqueous solution of iodin, followed by rinsing, after each mouth cleansing, than by misleading the laity, decrying the brush without offering a real substitute for it.

The paramount importance of patients constantly breaking up and removing infectious inspissated mucus films from all faces of teeth necks, and developing a highly polished surface thereat, especially mesially and distally, where septic deposits are otherwise left undisturbed, is easily realized by considering that infection otherwise causes the time honored pathological stages of congestion, inflammation and suppuration, wherever tissue resistance is lacking, as is usually the case in gingival ones.

Neither the proper, root to biting surface, brush motion, nor an efficient polisher carried by it dry, have ever injured tooth structure. It is the improper crosswise motion of bristles which wears transverse cervical grooves and irritates gingival margins, quite regardless of the dentifrice employed, unless it be gritty beyond reason. Bristles and water, or soap, and chalky, impalpable dentifrices, are unable to completely remove septic films from and develop the protecting polish on exposed surfaces of teeth, while a waxed thread or tape is similarly inefficient in comparison with positive polishing powder applied by suitable agents in both instances. It has been proven that five years' daily polishing of natural teeth with finely pulverized pumice stone resulted in perfect lustrous dental surfaces.

As to the "End"-*Ameba buccalis*, it is perfectly in accord with natural law that they should be feeding in the bacterial plaques mentioned, that they should pass on to recesses in gingival margins, as invaded and diseased, and that, as peridental tissues break down in the above described etiological and pathological processes, they should occupy the fundi of pockets, where a more favorable pasture invites them: stagnant pus cells, not red blood corpuscles. Like ducks, they should migrate to more favorable feeding grounds; but not as fast. They are unquestionably apt to be present, but not accountable as pathological factors. Etiology and clinic both thus point.

THE STORY OF A SET OF TEETH.

BY LOOMIS P. HASKELL, CHICAGO.

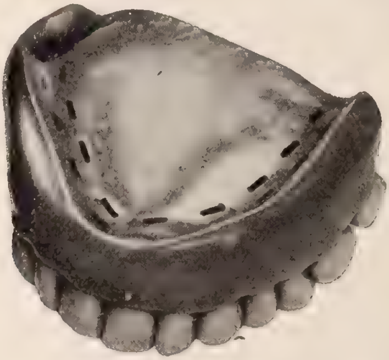
TWENTY-THREE YEARS AGO a patient was sent to me by a dentist in Montana. The case to all appearances was a very difficult one. He said six sets of teeth had been made by different dentists, rubber plates, but none at all satisfactory.

The conditions were these. A flat jaw, the palatal surface hard and convex, the impression attached to the margin. On the right side a deep depression, hard on account of the removal of necrosed bone. On the left side a flexible ridge.

The patient wanted two sets. I made them on aluminum. In these flat cases I have had better success with metal than with rubber, one of the advantages of which to the dentist is, he sees that the plate is all right before attaching the teeth.

In this class of cases, the "relief," instead of air chamber is all important and covering all the hard palatal surface, so the plate may not rest there, no change elsewhere.

Upon trying in the plate it adhered so strong I had to use an instrument to remove it. As the patient had a long upper lip he required a long bite, although it increases the leverage in eating. The work was completed with drawbacks and the patient was very greatly pleased. After he left as I had the dies and articulation, I made a set to keep herewith shown.



Ten years later he returned saying he had lost his extra set and did not want to be without one in case of accident, and also saying he often forgot he was using artificial teeth. I made the set, he wore them over night, said they were all right and left.

Ten years later he returned with his set broken through the front, the plate as well as the rubber, which was owing to the decay of his lower teeth, causing, by the new occlusion, a severe strain which broke down the upper set.

With the lower teeth crowned a new set was made, satisfactory as before.

I close by saying that the flat upper jaw is to me a delight.

Powers Building.

GOLD CROWN IN REMOVABLE BRIDGE WORK*

BY DR. P. A. GOULD, GIBSONBURG, OHIO.

THE OBJECT OF THIS CLINIC is to show how attachments may be made to teeth to hold removable dentures in place in such a manner that they may be of the greatest service that it is possible to attain, and not cause any irritation to the teeth to which they are attached. To make an attachment that is substantial enough to stand the service that may be required of it and at the same time be built within the space occupied by the teeth in a full denture, we must first take a survey of conditions that may exist.

It is well known that all surgical operations are subject to a return of irritation by constitutional disorders that may be developed from other infections. Also that this irritation to parts that have been subjected to traumatism, or surgery, when brought under the influence of toxemia, will at times develop pathogenic bacteria that have a severe effect upon constitutional disorders.

How little we think of these physiological conditions that may be developed, when performing surgical operations such as extracting a pulp and nerve, then filling the root canals!

Scientific research has shown that too generous uses of antiseptic medicaments produce an irritation by destroying healthy tissues and hence become of no value in preventing infection.

It is an established fact that sterile blood and its products can do more to heal a wound than any dressing or treatment that the doctor may give it; this is a very important thing to consider when we have sterile blood present.

Root canals that are sterile should be allowed to heal under these conditions, the sterile blood being forced back through the foramen of the root and held there with a dessicative substance that will allow nature to heal itself and at the same time prevent and not cause any infection.

Should the operator allow the hemorrhage to continue until it stops of its own accord, a serum will work itself into the apices of the roots. This will have to be removed, or it will produce an abscess as soon as some constitutional disorder presents a medium for it to develop pyogenic microorganisms.

A root that may have been well filled may also have like abscessed conditions produced from a mechanical irritation caused by an injury, or by being constantly irritated a little by some form of a prosthetic attachment, or an unsanitary condition.

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*Clinic Ohio State Dental Society.

The double crown attachment is the strongest, but unless properly constructed and all unnecessary irritation avoided in the operations, the results will not always be satisfactory.

First, no crown should be put on a root or tooth that will make trouble from any cause originating in a dead nerve or a filled root not properly healed. Now regarding a way to prepare a tooth so as to give a crown the best fit at the cervical line. The preparation for grinding of the teeth as given in the September number (1913) of THE DENTAL SUMMARY—the tooth is ground in the form of a pyramid (corners rounded) with the cervical line as a base and tapered to not more than 10 degrees from this point.

The band of the crown at the cervical line should be no larger than the measure at this point in its greatest outside circumference, the inside of the band must be filed to fit the taper of the tooth. This allows a perfect fit with no extension for the lodgments of debris and also makes it possible to have a definite point at which to cement the crown, and be in no danger of pushing it by this point, causing an irritation by a faulty condition, in the last process of the operation, the cementing the crown and the tooth. Next comes the proper way to construct the first and second crowns to be used in the work necessary to make an attachment which will not rock, tip or rotate the tooth in the socket.

The tooth is prepared as described above for the first or primary crown; this crown is made in the form of a cone with the point cut off, leaving the top or occlusal surface flat, the greatest circumference corresponding to the exact measure of the cervical line, made with a taper of an angle of about five degrees of 20-k. gold plate, 28 gauge. The top or secondary crown is made of 20-k., 26 gauge gold, the inner circumference being the small or occlusal circumference of the primary crown, filed on the inside to a bevel to fit taper of the primary crown. A space is left between the top of the primary and secondary crowns to throw all the support of the denture upon the taper of the primary crown; this also allows of a slight rocking movement in any direction without rocking the tooth, working on the principle of a ball and socket.

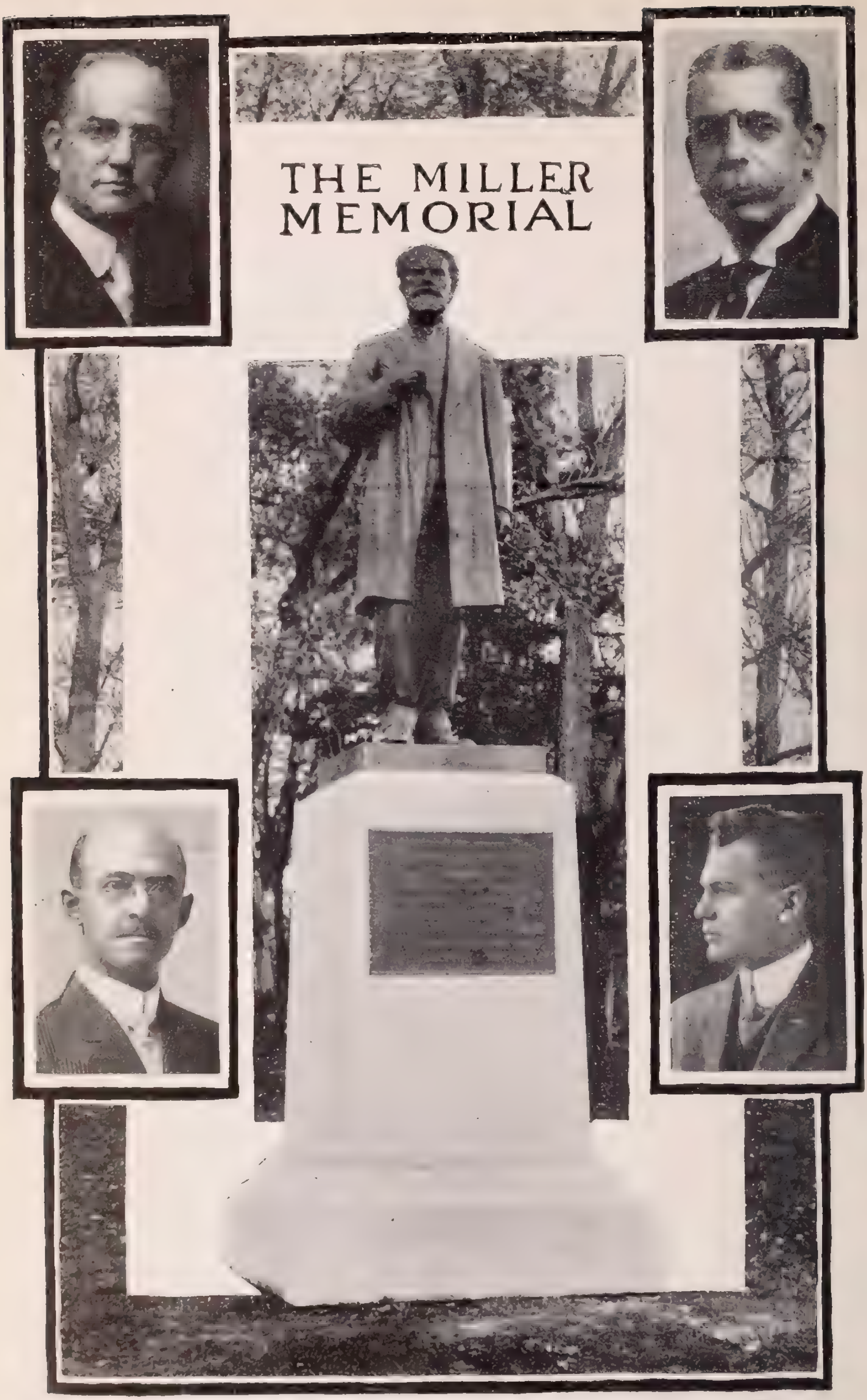
Third comes the selection of the teeth to be used for the attachments, noting the articulation, whether or not it is necessary to re-establish the line of occlusion.

Fourth the construction of, and proper relation of, gold bars to the crowns, that will render them the most effective in point of service. All bars are cast of an alloy of 22-k. gold and 18-k. gold solder, about two parts of gold to one part of solder. If constructed of good material, old gold bridges may be used for this purpose.

Much care must be used in the way the bars are made so as not to cause any rocking on the attachments and also to be strong enough to hold the teeth crowned in their proper places. Every case will have new features, and in fact, this part of the subject is enough to constitute a clinic by itself.

The Miller Memorial

THE MILLER MEMORIAL



Dr. C. L. Mills, Chairman
Dr. S. D. Ruggles

Miller Memorial Committee
Ohio State Dental Society
December 1909 to December 1915

Dr. J. R. Callahan
F. C. Hibbard, Sculptor

MILLER MEMORIAL UNVEILING*

PURSUANT TO THE PROGRAM of the Ohio State Dental Society, about three hundred members and guests of the society met at 2 P.M. Wednesday, December 8, on the campus of the Ohio State University, for the unveiling of the memorial erected in honor of Dr. W. D. Miller.

Miss Anna Brooks, grand-niece of Dr. Miller, released the drapery—and the beautiful and enduring tribute from the dentists of the United States, was formally unveiled.

The eight-foot bronze statue is a speaking likeness of Dr. Miller, and the base and die of pink Milford granite give it an elevation of seven feet. The memorial faces the west, and is erected on a sloping lawn to the south of the General Library Building, and has a background of several stately elms.

The bronze tablet on the front of the monument reads as follows:

Erected to the Memory of
Willoughby Dayton Miller
1853–1907
Dental Scientist and Educator
Benefactor of his Profession
Friend of Humanity
A Native of Ohio A Citizen of the World
By the Dentists of the United States
December 8, 1915.

The rear tablet reads:

Willoughby Dayton Miller
A.B., D.D.S., M.D., Ph.D., Sc.D.

Contributions for the Miller Memorial were as follows:

Alabama	$ 25.00
Arizona	25.00
Arkansas	50.00
California	60.00
Colorado	82.00
Connecticut	100.00
Florida	25.00
Georgia	60.00
Illinois	531.00
Indiana	75.00
Iowa	200.00
Kansas	134.50
Kentucky	105.00
Maine	25.00
Massachusetts	100.00
Brought Forward	$2212.50
New Hampshire	25.00
New Mexico	25.00
New York	125.00
South Carolina	25.00
North Dakota	50.00
South Dakota	15.00
Ohio	1303.00
Oklahoma	31.00
Oregon	50.00
Pennsylvania	220.00
Tennessee	50.00
Texas	50.00
Utah	14.00
Vermont	20.00

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*A part of the proceedings, Ohio State Dental Society, Columbus, December, 1915.

Michigan	300.00	Virginia	50.00
Minnesota	100.00	Washington	50.00
Missouri	100.00	West Virginia	25.00
Montana	15.00	Wisconsin	25.00
Nebraska	100.00	Wyoming	10.00
Carried Forward	2212.50		
Total			$4375.50
Interest to Dec. 1, 1915			667.33
Grand Total			5042.83
Paid Mr. F. C. Hibbard, Sculptor			5000.00
			*$42.83

Expense of the Committee, incident to this Memorial, paid out of the treasury of the Ohio State Dental Society,—$275.12

*This balance turned into Treasury of Ohio State Dental Society, to partially reimburse Expense of Committee.

Owing to the inclemency of the weather at this season of the year, it was arranged to have the addresses given in the University Chapel immediately following the unveiling.

Upon adjournment to the chapel, Dr. Edward C. Mills, president of the Ohio State Dental Society and chairman of the Miller Memorial Committee, called the meeting to order, inviting to the rostrum the speakers of the occasion, also Dr. Otto U. King, secretary of the National Dental Association, Drs. J. R. Callahan and S. D. Ruggles, the other members of the committee, and Dr. Weston A Price, treasurer of the committee.

The President: We have just witnessed the unveiling of a Memorial which shall stand as a lasting tribute to one of the most scientific men who has graced the dental profession. The thought seldom occurs, when we think of the lives of such men, that—instead of the pursuit of amusement and in enjoyment of social functions, their hours of recreation are devoted to the solving of such scientific problems as appeal to their minds; especially was this the case with Dr. Miller, whose days were fully occupied in caring for a large clinetele. As evidence of the sacrifices made by him in following the bent of his mind for research, I desire to read an extract from a letter written by Dr. Miller to his niece, Mrs. John Lowe, of Newton, Kansas, under date of November 23, 1884:

> "Busy as ever, or a little busier—as I have my lectures now to get ready and six hours weekly at the clinic.*** Not much news to tell. We live such a quiet life here. I *never* go out to dinners or parties or anything of that sort. I spend all my spare time in my laboratory, tinkering away at one thing or another. I have had applications from two publishing houses, urging me to write a book on dentistry, but I can't just make up my mind to undertake it, as I have so much else on hand."

Our committee extended an invitation to Mrs. Miller to be the guest of our society during this meeting, and I take this opportunity to read her letter of appreciation relative to the work we have just accomplished:

Middletown, Conn., Nov. 11, 1915

My dear Dr. Mills:

"Ever since I first heard of the project to erect a monument to my husband, I have felt deeply moved and gratified at the thought that his work was to be so highly honored by his colleagues in this country. I also think it very fitting that it should be located in his native State, so near his birthplace.

I read your letter inviting me to be present at the unveiling ceremony with great appreciation, but for various reasons it will be impossible for me to be present.

My sister-in-law, Mrs. William Browning (Alexandria, Ohio) will attend in my place. She will be staying with friends in Columbus; would you kindly communicate with her as to the time?

Again expressing my keen appreciation of the great honor done my beloved husband, I am

Very truly yours,
CAROLINE L. MILLER"

I wish at this time to acknowledge the beautiful wreaths from Dr. Wm. A. Spring, representing the American Dental Society, of Europe, and Dr. N. S. Jenkins, of New Haven, Conn. Also receipt of telegram from Dr. A. D. Black, of Chicago, who first suggested this Memorial, regretting his inability to be present.

At this point the following speakers were severally introduced by the president:

Dr. Edward C. Kirk, of Philadelphia, Dean of the Dental Department, of the University of Pennsylvania and Editor of *The Dental Cosmos.*

Dr. Truman W. Brophy, of Chicago, Dean of the Chicago Dental College, and President of the International Dental Federation.

Dr. N. S. Hoff, of Ann Arbor, Dean of the Dental Department, University of Michigan.

Dr. T. P. Hinman, President of the National Dental Association.

Prof. George W. Knight, Dean of the College of Education, the Ohio State University.

At the conclusion of these addresses (which appear elsewhere in this number), Dr. Mills spoke as follows:

"The question has just been asked by a member of the profession from outside the State, as to the finances of our committee in connection with the Memorial, and I told him that we had everything paid for—with a surplus.

There was an 18 ounce copper box, 9 x 12 inches, 8 inches deep, placed in the base of the Memorial, and when sealed weighed 30 pounds. In it were placed Volumes I and II of Koch's History of Dental Surgery; the 1914 Volume of Polk's Dental Directory; the Histories of all the State Societies that could be obtained (and I think I had all that had been published)—together with a great deal of historical matter relative to the Ohio State Dental Society, the Mississippi Valley Dental Association, and miscellaneous articles, of which record has been made in our old minute books.

I also attempted to get some member of the profession to write a letter to be placed in the box, and wrote to several —but as the time grew near, I realized if a letter went in, it was for me to write it. The letter written is as follows:"

Columbus, Ohio
October 12, 1915

To the Ohio State Dental Society, or any representative Dental Association of Ohio:

"When this box is brought to light, many years will have passed into eternity; generation after generation may have come and gone, and—with the exception of a few names which will be perpetuated in history—will have silently passed into oblivion. While it is an unhappy reflection that those of the dental profession whose names are found in the contents of this box will have crossed the Great Divide, another thought comes—that it is as natural to die as it is to live.

Considerable effort has been made to collect material that might be of interest to the members of the dental profession who are now unborn—that they may know what efforts have been made through the preceding years to give dentistry a high professional standing.

It would be a satisfaction to know at this time, what progress will have been made in our art, and in the sciences generally, when these records are taken from their long resting place; but each generation must be content with the progress of its own era, as there is no way of lifting the veil and peering into the future.

The literature on dentistry herein contained, will, we trust, be turned over to the State Dental Organization, and the fraternal rosters to the respective societies.

History will record the greatest war the world has yet seen, now being enacted by the Nations of Europe, while we at this time are thankful to God that our beloved country is at peace with all the world, and continues a harbor for the weak and oppressed.

Fraternally yours,
EDWARD C. MILLS"

Dr. W. H. Whitslar, Cleveland, Ohio: The work of erecting this Monument has consumed many hours, days, months and years of work, and of willingly-given service, and it seems fitting that we should recognize the ability with which this work has been carried on, by a vote of thanks to the chairman of the committee, Dr. Mills.

The President: The motion is out of order, unless the other members of the committee are included.

Dr. Whitslar: I will accept the correction, and so amend the motion—but I believe most of the credit goes to Dr. Mills.

(Dr. Whitslar puts motion, which is carried.)

The President: This has been to me a labor of love; a labor that I have enjoyed from the very moment that the resolutions were adopted by the Ohio State Dental Society; and now that this service is concluded, and the Memorial in its place I wish to say that I am very glad it was a duty and privilege assumed by our State Dental Society. I thank you. (Applause.)

WILLOUGHBY DAYTON MILLER*

BY EDWARD C. KIRK, D.D.S., SC.D., LL.D., PHILADELPHIA, PA.

WE HAVE MET TODAY in order that we may appropriately emphasize the realization of a desire of the dental profession of America to express in permanent form the honor in which we hold the memory of Willoughby Dayton Miller.

The suggestion which led to concerted action culminating in the noble and enduring memorial in the capital city of his native state to our greatest exponent of dental science was formulated in a letter from Dr. Arthur D. Black, of Chicago, to Dr. Edward C. Mills, of this city, under date of January 30th, 1909, in which, without prejudice to a movement then well under way to establish an international memorial to Professor Miller, he said: "It seems to me that since Dr. Miller was an American and since he did so much work for the profession, the dentists of America should do whatever they do for him in this country, and it also seems to me that the Ohio Society or a group of Ohio men should start such a movement."

Through the activities of a committee of the Columbus Dental Society, opportunity was quickly afforded to members of the dental profession of America to join in bringing to a successful issue the suggestion of Dr. Black, expressing as it did a desire shared by all. The dentists of forty-nine states contributed to the fund which has made possible the creation of this splendid portrait in bronze, of the most commanding figure ever associated with our calling, a memorial which now and for all time shall portray our recognition of his service to the dental profession and to humanity, our appreciation of his exalted attainments and noble character, and our honest pride in the fact that he was an American and a distinguished son of Ohio.

What was the service, what the attainment and character that so distinguished this man that the members of his profession, scattered over two continents, have honored him as none other among them ever has been honored? To give a full and comprehensive answer to such an inquiry would constitute, a task beyond the powers of any single individual. The average human character is a complex problem, but his was not the ordinary type, it was a very exceptional character; therefore I can only hope to portray its more outstanding features in broad lines, which, however imperfectly they may represent the man as he was, will at least, I feel sure, justify the reverent regard we all have for him.

In the autumn of 1877 Miller, then but twenty-four years of age, and having recently arrived from Berlin where he had been a student in science, joined the entering class at the Pennsylvania College of Dental Surgery in

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*Address delivered on the occasion of the unveiling of the Memorial to Dr. Miller in Columbus, Ohio, December 8, 1915.

Philadelphia. It was the usual heterogeneous cosmopolitan group characteristic of the classes of the Philadelphia dental schools at that period, but in a class composed of individuals of distinctive and diverse personality, Miller was even among these in a class by himself. His personality set him apart from the rest as one distinguished above his fellows. His well-disciplined and active brain, his insatiable thirst for knowledge, his native modesty and great personal charm made him a center of interest for the entire class. He quickly became mentor and intellectual guide for his fellows, and his perennial interests in every problem that grew out of the experiences of the course made him the willing listener to the difficulties of his fellow students and their unfailing helper in overcoming the obstacles that beset their educational pathway.

His reputation and status with his classmen were established on a firm foundation before the members of the faculty had discovered in their midst the greatness and importance of the phenomenon which his wonderful mind presented. The first revelation was manifested some weeks after the beginning of the course at a lecture by Dr. J. Ewing Mears, the then professor of anatomy. Miller on the occasion in question, occupied a seat on the front row among the senior students and the lecturer, without previous notice, devoted the first portion of his hour to conducting a review quiz on his subject. He propounded a question which three men in succession failed to answer and it was then given to Miller, he being the next man in order. Miller answered the question correctly and he was promptly given another, with like result. The professor became interested and followed up the attack with a rapid volley of questions, each one of which Miller with perfect composure answered correctly. The situation became thrilling as the professor continued and with like result to probe to its depths Miller's knowledge of anatomy but without sounding its limits, for the class in its enthusiasm broke out into spontaneous applause, whereat Dr. Mears not only gracefully acknowledged his defeat but graciously complimented Miller upon his knowledge of anatomy.

As with the subject of anatomy, so also did he master every other feature of the curriculum; indeed, the curriculum itself fell short of giving full exercise to his mental faculties or his capacity for study. What previous attention he may have given to the study of French I do not know, but during his period of dental studentship in Philadelphia, he was giving such time as was available to the systematic study of that language both from books and by exchanging language lessons with students in his class, to whom French was their native tongue. His interest in scientific subjects was intense and constantly active, qualities so manifest on all occasions that it was a common saying among us, that he absorbed knowledge as a sponge absorbs water.

Miller had no enemies. The sweetness and childlike simplicity of his nature attracted everyone of his classmates to him. One had to discover the extent of his learning by the demand for his intellectual help. His modesty was inborn and part of the texture of his natural character so that the vanity of knowledge that vaunts itself was impossible to him. He completed his preparatory dental education at the newly organized Department of Dentistry of the University of Pennsylvania, graduating therefrom in the spring of 1879, with the first class that issued from the institution, at which time he was awarded the faculty prize for the best thesis on the "Conservative Treatment of the Dental Pulp."

Miller upon graduation returned to Germany, leaving those of us who had known him through his dental college days strong in the belief and expectation that ere long we should hear from him as the doer of great things in our profession. None of us, however, could have foreseen how abundantly the realization would surpass the expectation.

About three years after this return to Germany, preliminary reports of his scientific studies began to make their appearance. Probably his earliest contribution was on "Electrical Phenomena in the Human Mouth," published first in the *Deutsche Medicinische Wochenschrift* in 1881, and afterwards republished in English in 1883, in the *Independent Practitioner*. The title of this paper is sufficiently descriptive of its textual contents, but it fails to convey an idea of what may be described as its animating motive. In reality the paper is the initial attack which this master mind made with brilliant success upon the complex problem of the causation of dental caries. During the following year he published in a German periodical an important article on the "Influence of Micro-organisms upon Caries of the Human Teeth," and then followed in rapid succession his series of papers, beginning in 1883, in the *Independent Practitioner*, detailing the results of his researches in connection with the causation of dental caries and in which he settled for all time the exact nature of the process of tooth decay.

The publication of this work created a profound impression not only among members of the dental profession but among medical men and biologists throughout the world. Dental caries because of its universality and because of the results which it entails of pain, discomfort and damage to bodily health, had focused the attention of investigators for centuries in the effort to discover its cause and thereby a means for its amelioration or prevention. When announcement came from Berlin that Miller had solved this "problem of the ages" the dental profession of two continents applauded, and many were astonished, but those who had sat with him on the college benches during his course of professional training and knew him as a student were not surprised, for his triumphant achievement was for them but the fulfillment of their expectation regarding him.

The brilliancy of his research upon the nature of dental caries has served to obscure, to no small extent, the importance of some of his subsequent researches, and from the circumstances surrounding the subject it is no doubt natural that his study of dental caries should be regarded as his greatest work. A careful study of his writings, however, has developed in me an increasing conviction that as his later work becomes more generally known, it will be found that we owe to him as large, if not a larger debt of gratitude for his revelations concerning the human mouth as a focus of infection, as we generally accorded him for his work on the nature of tooth decay.

In a certain sense the road leading to the discovery of the causation of dental caries had been prepared by the predecessors of Miller. The germ theory of disease causation, strengthened by the investigations of Pasteur, Tyndall, Cohn, Helmholtz, Burdon Sanderson, de Bary, Roberts, Lister and a host of others, whose findings served to demolish the current belief that the processes of fermentation and putrefaction were due to organisms generated spontaneously in organic fluids, had paved the way for the epoch-making discoveries of Robert Koch which experimentally established the etiological relation of microorganisms to disease processes. Leading directly up to Miller's research was the important work of Magitot, Leber and Rottenstein, Galippe et Vignal and more particularly that of Milles and Underwood presented at the Seventh International Congress of Medicine in London in 1877. Each of these investigators pursued his study from the point of view that the process of fermentation or of putrefaction was in some way concerned in the causation of dental caries, and Milles and Underwood went so far as to assert that "the organic fibrils upon which the organisms feed and in which they multiply are the scene of the manufacture of their characteristic acids, which in turn decalcify the matrix and discolor the whole mass."

It remained for Miller to determine the exact nature of this relation and with the methods, devised by Koch for the isolation of microorganisms in pure culture at his command, he was able, after a long and painstaking research to announce that dental caries is a chemico-parasitic disorder, caused by the solvent action of lactic acid generated by the enzyme action of a certain type of microorganism upon carbohydrate food debris, the acid removing the mineral constituents of the tooth structure and exposing the organic matrix to the liquefying action of proteolytic and putrefactive bacteria.

The thoughtful student of the reported records of Miller's work cannot fail to be deeply impressed not only by the ingenuity and painstaking care that is evident in its every detail, but more especially by the scientific broadmindedness which characterized his mental attitude toward all of the problems he sought to solve.

At the period when his work on the problem of dental caries was undertaken, many theories as to the causation of the disorder were tenaciously held and loudly proclaimed by their respective advocates. This conflict of opinion fortified by no small degree of prejudice greatly complicated and increased the difficulties of Miller's task. In view of the existing circumstances it became necessary for him to solve the problem of dental caries not only positively, but negatively; to prove what it was not, as well as what it was. His preliminary attack on the problem was on the negative side and his first contribution to the subject "Electric Phenomena in the Human Mouth" to which I have already alluded, was the record of an investigation of the claims of a number of theorists who held that tooth decay was caused by electrical or galvanic action. Miller's study of this question demonstrated that the theory had no warrant in fact, and the ground was thus cleared of that particular obstacle so that inquiry from the positive side of the problem might be undertaken.

The report of his work finally leading to the determination of the exact nature of the carious process is remarkable for its minuteness of detail and the painstaking care with which all the factors of possible error are eliminated and the evidence is presented in such logical and convincing order and array that the reader's acceptance of his conclusions is inevitable. However, inasmuch as it is the dictum of science that the truths of nature shall be established upon a sure and unalterable foundation, it is important that the conclusions even of master minds shall be revised and examined as to their soundness by those competent to pass judgment thereon, it is gratifying to know that Miller's work on the etiology of dental caries has been passed under critical review notably by Alfred Kantorowicz, of Munich, Erich Baumgartner, of Gratz, Kenneth W. Goadby, of London and L. Fleischmann, of Vienna. These investigators have repeated Miller's studies and amply verified the correctness of his findings which must stand for all time as the greatest gift of dentistry to mankind and the most enduring monument of the scientific genius of their author.

It is frequently said that Miller was the discoverer of the cause of dental caries. This popular summary of his work needs qualification and explanation as much as does the catchy phrase "extension for prevention." What Miller's research revealed and settled for all time was the nature of the intimate process of tooth decay, which involves but a part and only a part of the cause of tooth decay. No word in the English language probably is used more loosely or with greater disregard of its proper limitations than the term "cause." No one recognized more clearly than Miller the fact that his discovery of the nature of the carious process was but a step toward the solution of the more comprehensive problem of the cause of dental caries. Having determined the nature of the process, he set about the study of the generally accepted fact that there is a marked variation among individuals in their relative susceptibility to dental caries. He had shown the nature of the process when once it is established in a given case, but it yet remained to be shown why certain individuals showed a predilection for the disorder while others wholly escaped.

In short the true cause of dental caries could not be comprehensively defined until the problem of immunity and susceptibility had been solved. It was to work on this all-important question that Miller devoted a large part of his time and thought during the subsequent working period allotted to him. His studies of the assumed antiseptic properties of the saliva, of food habit in relation to dental caries, of bacterial plaque formation, in short, of the nutritional and environmental factors relating to the teeth and their destruction by the carious process, are the records of his unceasing effort to determine the cause of dental caries. He died before the full answer was possible, but none can doubt that had he been permitted to continue his researches, he would have given us in the fulness of time the complete answer. The rich legacy of determined facts bearing on the problem which he has left to us are the foundation and starting point from which the master workmen of the future in dental science must complete the edifice, which he so brilliantly planned and carried forward to the time of his death.

Those who were permitted to gain an insight into the deeper motive forces of Miller's character are justified in their belief that his unflagging interest in the study of dental caries had its inception in a humanitarian impluse. His capacity for sympathy with humanity knew no bounds. Like Abou ben Adhem he "loved his fellowmen." His life was not only enriched and ennobled by his altruistic spirit, but it is unquestionably true that the same spirit shaped the impulse which led him to take up the study of dental caries, in order that he might assist in the emancipation of humanity from the burden of distress which the malady and its allied disorders entailed.

Almost coincidently with the publication of his results in the study of tooth decay, began the announcement of his studies of the means for the prevention of the disorder. This pioneer work is analogous to his early work on caries in that it clears the ground of much that was false in conception regarding the use of mouth antiseptics and by assigning to these useful agents their proper relative place, his research enables us to use them with a definite and scientific knowledge of their limitations.

The same may be said of his remarkable work upon dentifrices. It was essentially pioneer work in that it demonstrated the falsity of the premises upon which many of our ideas as to their usefulness has been based, and indicated the directions upon which progress should be made in perfecting the composition and popular use of these indispensable adjuncts to the hygienic care of the mouth. No feature of Miller's researches demonstrated more abundantly than his work on dentifrices his capacity for sustained and unflagging industry. He reports that in order to prepare the specimens necessary to demonstrate the wasting of tooth structure due to the habitual use of improperly compounded abrasive dentifrices, he and his assistant spent during an entire year "an average of sixteen hours per day and altogether, on a very moderate estimate, 10,000 hours on the work."

I have expressed the opinion that Miller's studies of the "Human Mouth as a Focus of Infection" will command from future generations as great a sense of gratitude as we already accord him for his work on dental caries. In the series of papers embodying his studies of the pathogenic activities of the bacterial flora of the mouth cavity and their relation to disease causation in remote parts of the body, he not only marshalled in order the clinical and scientific evidence bearing on that relation, but he experimentally demonstrated the possibility of transmission of oral pathogenic fungi via the blood stream, and the establishment by that means of foci of metastatic inflammatory reactions in distant parts of the organism. His discovery of the principle of mouth infection as a source of disease causation is destined to bring about results of far-reaching importance. Of this department of Miller's work nearly eight years ago I elsewhere said: "His investigations of the pathogenic fungi of the human mouth cavity have enriched our knowledge of oral diseases and their systemic relations to such an extent as to have really added a new department to the science and art of healing, and given to dentistry a dignity and importance which it previously lacked in public estimation. His clear expositions of the importance of the human mouth as a focus of infection have exerted a modifying influence upon medical practice by directing attention to the dangers which arise from that source of disease causation, and in a similar way they have improved certain phases of surgical procedure for the same general reasons."

In view of the present widespread interest in metastatic inflammatory foci in various parts of the body having their initial invasion via the mouth and oral tissues, and especially in view of the later rediscovery and exploitation of these same principles, it behooves us to record the fact, lest we forget to render homage where homage is justly due, that the pioneer work by which the discovery was made possible was done by him whose life and character we honor today, and that the discovery of the involved principle was also his discovery. The last fifty pages of his book on the "Micro-organisms of the Human Mouth" and his series of papers on the "Human Mouth as a Focus of Infection contain" that record. When he died, those who knew him only through his published work, were overwhelmed in common with those who knew him as the man he was and the dominant note which in a professional sense was expressive of the general feeling of grief, was that he had been taken away in the midst of his work, leaving uncompleted the greatest service he seemed clearly destined to render to his profession and to humanity.

It is an inherent attribute of the human soul that in its occasional glimpses of the infinitely true and good, it vainly endeavors to give permanency and immortality to its visions. On the mount of transfiguration, the enthralled witnesses of that divine spectacle would fain have materialized in some permanent way the memory of their exaltation, but the tabernacle was never built other than in the deeper recesses of their own souls. So we, with our finite human vision, felt that a long period of years of increasing usefulness to us and the world at large lay before Miller when, after many years of devoted service, crowned with great honors and appreciation in Germany, he returned to his native land in 1907, prepared, as Dean of the Dental School of the University of Michigan, to cast in his lot with his American colleagues, and devote his energies and the remaining years of his life to the advancement of our professional interests through the agencies of higher education. The promise was not to be fulfilled in that way.

We also would fain have built our tabernacle and we are building it surely and certainly with the data and above all by reason of the inspiration which his life and his work has given to us as our inheritance. It is right and fitting that we should erect to his memory this noble monument so that future generations may be led to make inquiry about him and so learn of his noble life and the splendid heritage of his gifts to suffering humanity. But when I think of the man and his work my mind reverts to the epitaph of Sir Christopher Wren, the architect of St. Paul's Cathedral, carved on a tablet in the great building that his genius created.

"*Si monumentum quaeris circumspice.*"

So also if we would ask where is the monument of Miller the answer must be for all time, "in his service to humanity."

It would not, even on such an occasion as this, be permissible to lift the curtain that surrounded his personal and domestic life, yet there were two factors which gave direction and character to all that he did and to which I feel that I may reverently refer. Miller was a man of deeply religious nature. To him religion was a life, not a system of ethical philosophy. Nature to him was a revelation of the Divine purpose and as a scientist he was a searcher after the truth concerning that purpose. To him there was no such thing as conflict between religion and science, each being to his mind the complement of the other. I refer to this because it was during his early formative days that the controversy arising between exponents of ultra religious thought, and extremists in scientific philosophy looking toward an adjustment of these problems on more rational lines, reached the climax of intensity. Early imbued with belief in the principles of Christian faith, his adherence thereto remained unshaken always so that it may be said of him, as it was said of the late Dr. S. Weir Mitchell, physician, author and scientist:

"The simplicity of his faith was the expression of the natural simplicity of his nature. The winds of criticism and the doubts of the day passed by him. To him there was no conflict between religion and science. Great as was his love for science he approached her arcana with the same simplicity and reverence for truth that characterized his religious faith which he had early known and seen and which he cherished to the end."

We shall never know how much of inspiration and direction he drew from his devoted wife, the daughter of the late Dr. F. P. Abbott of Berlin, whom he married soon after his return to Germany, after earning his dental degree in America, but no estimate of the circumstances and molding forces of his brilliant career would fully or worthily explain his character, his work, his ideals, his magnificient achievement that did not take into account the dominating influence of his ideal marriage and domestic life.

He has left to us of his profession the heritage of a noble example and a legacy of scientific knowledge, the effect of which has been to change the whole current and direction of our thought so definitely into the channels of a true professionalism, that there can be no turning back. Each of us therefore in laying claim to our share in this rich endowment, can but review and renew his brilliant and unfading record, and in so doing acclaim our pride in the fact that such a life has been lived among us, has been shared by us and, most of all, that it shall remain a perpetual inheritance of us all.

WILLOUGHBY DAYTON MILLER*

BY TRUMAN W. BROPHY, M.D., D.D.S., LL.D., SC.D., CHICAGO, ILL.

FIRST I WANT TO STATE THAT I recently received a letter from Prof. Godon, of Paris, the first president of the International Dental Federation. He wished me to state for him that he deeply regretted his inability to be here and participate in this memorial meeting. He happens to be the mayor of his section of Paris, and you all know that it would be impossible for him to come under the circumstances. I say this because Prof. Godon loved Dr. Miller, and he wished me to convey to those present his regrets at not being able to be here today.

Now I desire to express to you my feelings regarding the remarkable achievement of building the monument which has been unveiled today. I desire to congratulate you, sir, and your committee, on having so faithfully carried out the undertaking of a few years ago. The work of creating a monument, however, or erecting a bronze statue is little after all, compared with the real monument that has been erected to humanity by the life of Dr. Miller. I knew him as a scientist, I knew him as a practitioner, and an association worker, and I knew him as a friend. In all these relations I enjoyed him. I appreciated his worth and all that he achieved in the interest of humanity. Dr. Miller fortunately made his home in a region where scientific work was accomplished with the greatest of ease. He was surrounded by men who were always at home in the pursuit of scientific achievement, those who made progress in all departments of science. As has been stated, he was a born scientist; he could not live without following out the bent of his nature. In Europe he was the ideal professional man. He worked faithfully, not only in the doing of his scientific work, but in bringing about and cementing together those delightful relations which made the profession of Europe a great bulwark in the advancement of science. He found Europe without organization, and largely through his efforts, members of the profession were brought together in the country of his adoption, and then the other nations were united into a great international organization. When that noble Frenchman achieved a world wide success in organizing and carrying to completion the International Dental Federation, Dr. Miller joined and became, after the passing of the service as president, of Prof. Godon, the president of the International Dental Federation. He occupied the position up to the time of his death. This organization has never been understood in America as it should be. It was organized to accomplish a world work. The president has referred to the International Miller Memorial, which was begun immediately after the death of Dr. Miller, and has grown to be a tremendous influence in the recognition of men whose achievements in the profession have marked them as eminent practitioners and scientists. This movement was in the form of a memorial for the purpose I have stated, of recognizing men of eminence, and showing to the world that their services were appreciated. The memorial is in the form of a fund, and the interest from that fund is used for the purpose of bestowing a medal, a diploma and a sum of money upon the one, who, in the estimation of the world's representatives, has accomplished the greatest amount of work in the interests of the dental profession. The first award made was to the late Prof. Greene V. Black of America, a man whom the representatives of the world believed had done the greatest amount of work in the interest of dentistry and of humanity.

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*An Address at the Miller Memorial Unveiling, Ohio State Dental Society meeting, Columbus, Ohio, December, 1915.

Dr. Miller was noted for his good fellowship, and when after years of labor he found his health was breaking, he found that it was necessary to do something in order that he might maintain his strength, he engaged in outdoor exercise, and while it may not be known, he achieved great distinction in outdoor sports. He was the golf champion not only of Germany but of Austria. This might seem an unnecessary expenditure of time, but it was done deliberately for the purpose of upbuilding his health, so that he might continue in the work of his choice.

Ohio has won renown, not only at home, but throughout the world, for having produced so many distinguished sons and daughters. Men of Ohio have occupied the first places upon the bench, in the clergy, in statesmenship, but none have filled a position more honored, none have accomplished work of a higher character than that done by Dr. Miller. Every one, with few exceptions, has been a sufferer from maladies of the teeth and mouth and other parts of the body, the origin of the disease having been in the mouth, and so nearly every one has profited by the life and the work of Dr. Miller. Were a man today to discover a cure for cancer, he would be regarded as a great benefactor. How few there are who are subject to this disease, compared with those who are suffering from dental diseases which are frequently pre-cancerous. It has been shown through the work of an Ohio man first, that diseases of the teeth and those immediately associated with them are the cause of more maladies than any other source known to the human family.

There is a reason why Ohio has achieved so much, a reason why Ohio has produced so many eminent men and women. Did it ever occur to you what that reason is? It was in the Western Reserve of Ohio where the Puritans of New England and the Cavaliers of Virginia met, and the union of those families really has made Ohio the mother of the presidents. Those families have brought to you men like Miller. Most commendable has been the work achieved by medical men of your state in the advancement of science. John Stephan, of Cleveland, (I think the young man will forgive me if I mention his name, for he is here today), brought to the attention of Dr. Upson, of Cleveland, the importance of dental diseases, and Dr. Upson, through his research and writings, brought to the attention of the medical world the appalling destruction of life due to lesions of the teeth and those emanating directly from them. The work of Upson made the medical profession think over this subject, and today it is the most important one in medical literature. Dr. Miller made it possible for Dr. Upson to do what he did, and Dr. Upson's work, though small in volume, has been the largest product of the medical profession for a century.

Dr. Miller passed at a time when his life seemed to have in it so much for his fellowmen. Had he lived to an advanced age, he would have solved many of the great problems before the dental profession today, but his influence is felt here now.

Was Dr. Miller great? If he were not great, then there is no human greatness. When he planted the seeds of science, he did so wisely; and what do we see here today? Have we not in the gentleman sitting at my left a disciple of Miller? Has he not worked night and day to put on a substantial foundation in his state and throughout the nation, the work that Miller began? This monument is grand, it is a mark of appreciation of the great scientist. Grand as it is, however, it is small compared with the gigantic work that has been accomplished and will continue to be accomplished by Dr. Price in carrying out the things that Miller stood for. (Applause). I am sure that if Dr. Miller were here and could realize what he did in stimulating this interest in the advancement of scientific work in the field of his choice, he would think that it had not been in vain. Yes, it is the passing of a great man. We are here today because he was a great man. It is not only the dedication of this monument that brings us here, but we are here to honor a memory, and, while time goes on, the name of Miller will live as it does live, and I am one of those who believe that such a life never passes. The body may disappear, but the life is here, and we feel it, and it will continue to be felt in literature even unto the ages of those unborn.

THE TECHNIC OF DRAINING APICAL ABSCESS*

BY H. W. ZELLERS, D.D.S., YOUNGSTOWN, OHIO.

I used a lathe with the Myer's Air Compressor with a rubber tube placed on the intake hole of the compressor. At the end of the rubber tube I had a pointed glass tube which I sealed in the cavity of the abscessed tooth with gutta-percha; starting the lathe, the suction created by the air compressor would drain out any gas or pus in the tooth. I also had a lathe attached so as to collect the pus. A very practical method perhaps, and one that I use in my office most, is with the saliva ejector and the suction from that will be enough to relieve the patient of its pain.

Perhaps this is quite vague since you have not seen it work; but yet it is quite effective.

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*Clinic Ohio State Dental Society, 1915.

WILLOUGHBY DAYTON MILLER*

BY NELVILLE S. HOFF, D.D.S., ANN ARBOR, MICH.

I HAVE BEEN ASKED to come here and tell the story of why Dr. Miller came to America. I cannot tell you the whole story, because it is too long, although it might be very interesting to some of you. After the death of the beloved Dean of our Department, Dr. Jonathan Taft, our Regents came to the Dental Faculty, and asked us whom we were going to have for our Dean. We had considered this matter even before Dr. Taft's death, and it was at his suggestion that we turned our faces to Dr. Miller as the man we wanted. We began our approaches to him at the time of the Dental Congress in St. Louis, but it took us three years to secure his consent to come. I hoped Dr. Brophy would tell you more about the conditions under which Dr. Miller lived in Germany, because he knows them better than I do. When I tell you that during the three years that we were negotiating with Dr. Miller, and trying to induce him to come to America, there were strong influences being exerted in Germany, and in fact all over Europe, counteracting the endeavors we were putting forth to secure him, you will then understand that our task was a difficult one. We did not know the power or extent of that influence, we did not discover its strength until we were about to give up our quest. It was Dr. Miller's desire that he could return to his own country and complete his life's work here. He expressed this desire to me in a conversation I had with him at the time of the meeting in St. Louis, and it was that fact that gave us hope and made us continue our efforts, for he was the man we wanted. You may know Dr. Miller graduated from the Literary Department of the University of Michigan, and two members of our Board of Regents were classmates of his, and when we mentioned his name to them, they said, "He is our man and we must have him." One of these men and Dr. Vaughan, the Dean of our Medical School, another classmate, and Dr. Darling, then Acting Dean of the Dental School, were appointed a committee to secure his consent to come to our school. These men did all they possibly could to induce him to come. I don't know that Dr. Miller wanted to come particularly to the University of Michigan, but he wanted to come back to America, as he desired to finish his career here at home, and he knew there was a great work here for some one to do. We tried to make it clear to him, of course, that this work could better be done in Ann Arbor, than anywhere else, and we succeeded. That was not, however, so difficult a proposition, because he believed that in this country lay the future of dental science, and that the work he had struggled so hard and long to do in Germany, could be completed in some good University environment in this country, as well as there. I think he realized that his physical strength was such that what he undertook must be done at that time, and this perhaps was a strong factor in his decision to come here. He left Europe and came to this country against the advice and strong protests of his personal and devoted friends in Berlin. He was one of the most active workers in the American Church in Berlin, and they were heartbroken when he decided to leave them. The American dentists practicing in Europe, were very seriously alarmed and fearful that things would go wrong with them if Dr. Miller left the country. The German dentists petitioned him strongly to stay; the German Emperor conferred upon him the highest honor he could, and a German citizen, a merchant of Berlin, offered to build and equip a scientific laboratory for him and support it in whatever way he desired, if he would stay. In the face of all that, it seemed to us there was no hope that we could possibly induce him to break off such social and professional relations, besides numerous other things he had been so many years accumulating and establishing. It seemed to us when all those facts became known to us, as they did eventually, that it was impossible for us to secure him. I went one day to see Dr. Vaughan, and he said he had received a letter from Berlin. "I fear we shall have to give it up." I said, "Why?" And he told me about some of these things that were detaining him. I asked him if Dr. Miller had given us up, and he said "No, he hasn't, but I don't think there is any use going any farther." I went away from him much discouraged, because I had the feeling that there was no one else who could meet our requirements, and I was determined that we should have Dr. Miller. I wrote him a letter and put all the arguments I thought I was justified in doing, in that letter. In a short time I received a letter from him, indicating that he was reconsidering the matter, and a mutual friend in Berlin wrote me what he thought Dr. Miller would like to do in the matter. It was again taken up by the committee, and we got a letter stating that if we would do certain things he would consider the matter favorably. We took it up with the Board of Regents and they said. "Is that all that he wants?" We said, "That is all he wants now." This involved a new building and research laboratory for him, and certain scientific apparatus which he specially needed. They said, "We don't know whether we have money enough for that now. Can't you wait until the Legislature meets, and we will go to the Legislature for the money?" We said, "No, we can't wait twenty-four hours. Anything done, must be done immediately." The two members of the Board we were consulting were his friends, and they said, "We will go into the meeting and discuss the matter informally, and if we think there is any prospect of carrying it through, we will bring it up officially." In half an hour one of these men came to my office and said, "The president has been authorized to cable Dr. Miller that the building will be built, and he is authorized to contract for the scientific apparatus he wants, and his salary will be so much." That completed the transaction so far as we were concerned, and within a few weeks we got a letter from Dr. Miller saying he would accept.

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*An Address at the Miller Memorial unveiling, Ohio State Dental Society, December 1915

Thus he broke off his relations in Europe, and although he never told me so, others told me afterwards, what it meant to him. I know that when he arrived in Ann Arbor, he was physically almost exhausted. The effort he had made to break off his relations, the moving, and the coming to a new field, which was in its outcome problematic to him, was a tremendous effort for him physically and mentally. In more ways than we had any notion of at the time, I am sure it was a great strain upon his vitality.

He came and spent a week with us, getting his work settled and making his living arrangements. He wanted a Faculty meeting the very next day after he arrived. We called a Faculty meeting, and we had some of the Medical Faculty who were interested in our work, present. We told him what we had in mind as the policy of our school. I was surprised to discover that he knew, without our telling him, the educational situation in this country as well as we did. He had some ideas about the work we should undertake to do, that were better than anything we had ever attempted. They were like all his ideas, progressive, and of the most elevating character. He presented them to the meeting, and said, "Do you think the University will stand for that kind of a program?" We all said they would stand for anything he proposed, because he hadn't suggested anything that was not in accordance with the general spirit of the University management, and we said, "We are sure the Regents will stand for it." He said, "Then we shall accomplish something worth while." The very next day he said to me, "I am satisfied with this arrangement, now that I know what you want me to do." He seemed to have had the notion that we were going to expect great things from him, and that we were going to expect him to take charge of the Department and build it up with students, and do a lot of executive work, such as handling the management of students, and all that. When we told him that he was to be relieved of things of that sort, he was very much pleased. He said, "Now that everything is clear, I want a couple of men right away." I said, "What kind of men?" "I want the best men you have, specially a good physiological chemist. Have you got him?" I said, "We have several in the University; I don't know how good they are, but we will go over and see." We went to the Medical Department, and saw Dr. Vaughan, and he told him what he wanted. Dr. Vaughan replied, "I have just the man for you." The man was called in, and Dr. Miller had a long talk with him, and within an hour he was telling that man what he wanted him to do, and that same day he put him to work on a research on saliva. The next day I said, "What do you want of this other man?" He said, "I want a man in Histology. I have a matter I must work out, which I began in Berlin, but I couldn't finish it." We found a man for this job, and he put him to work. Within two days he had started those two researchers. He was the busiest man I ever met, and he kept me busy doing his errands for the few days he was with us. He also made everybody around the place enthusiastic. We all felt as though we really had a good angel in our presence, because he was so courteous and interesting. I never met a kinder man in my life, a man more sympathetic; in fact, one of the medical men who was present at our meeting, when he left the room said to me, "There is the greatest man I have ever seen," and that is a good deal for a man in his position to say. He took us by storm. I may be a bit over-enthusiastic about Dr. Miller because I learned to love him over night almost, and my infatuation for the man was so strong that I cannot help expressing my feelings when I think of his wonderful greatness, associated as it was with a marvelous degree of kindness and friendliness.

Dr. Kirk has outlined some of the things that he did, but nobody could portray what the man really was. He was the biggest hearted man I ever encountered, for he loved humanity better than himself; he was the strongest man, intellectually, I think I have ever come in contact with.

The work he came to us to do was not to take over the reconstruction or building up of the undergraduate work of our Dental School, but he was called to take charge of the more advanced work, as well as to outline the policy of the school and the courses of instruction. He was glad to do that, but he didn't want to be bothered with the executive details, although I may say that I never met a man who had greater executive capacity than he exhibited in the short time he was with us. He knew what he wanted to do, and how to do it. Our first request of him was that he take charge of the school as its head, and outline and direct its policy. In addition, we asked him to establish the research laboratories for doing research work on a high scientific basis. We had always planned to do this work in our school, but had never had anyone qualified to direct it. He entered into this plan with enthusiasm as it was work that was very dear to him. The most important thing we asked him to do, in our judgment, was that he organize a post graduate training school for men who had shown a capacity and disposition for dental scientific work as under-graduates. He hadn't thought of that, but it appealed to him strongly, and nothing we asked him to undertake appealed to him so strongly after he had carefully considered it. All these things would keep him busy, and we knew they would, but he said he would gladly undertake to do them. When I heard Dr. Price make his appeal last night for scientific workers, my mind went back to the time when we proposed this matter to Dr. Miller, and he took it up so eagerly. It was the thing, it seemed to me, we needed then more than anything else in this country. We surely need scientific workers today, as we haven't them, and what is worse, we have no means of obtaining them. We should have a normal training school for dental science workers. That is what we hoped to have Dr. Miller do, in connection with our school.

Dr. Miller stayed with us only for a week, and then said to me, "I want to go down to the farm and rest." He owned a farm at Alexandria, near here, which had been his playground all the time he was in Europe. He said, "I want to go home and take my golf sticks with me, and play golf out in the fields for a few days, and then I shall go up to Minneapolis to the National meeting, and see the men." He said, "I want to say to you before I go, that although, as you know, I came here against the strong protests of all my friends in Europe, I took this step because I wanted to finish my work in my own country, and I thought I had an opportunity to do it here. Since I have been here, and have gone over the ground, and know what you expect of me, and have seen the opportunities for work here, I believe we are going to accomplish great things, not only for the University, but for the profession in America." And he said, "I want you to know that I am perfectly satisfied, and I am happy, and I shall go down to the farm and play golf, feeling that everything is settled, and it is settled right." Those were the last words he ever said to me. A short time afterwards, I received a short letter from him, written with a pencil on a piece of blank paper, in which he said, "I am writing this in bed. I fear I have appendicitis. Have we any authority in Ann Arbor?" I immediately went to the telegraph office and wired him to come to Ann Arbor as quickly as he could, but he couldn't come, and you all know the result.

When he died, our hopes were blasted, because we knew there was no one that could take his place, that there was no one we could secure that in any degree could fill the position we had outlined for him.

We had learned in the few days he was with us to love him for himself, and one of the most severe blows I ever have experienced in my life was to have to give him up, and it seemed as though we could not recover from it.

I have been wondering since I have been here today, and I have been thinking of it while I have been sitting here on this platform, whether or not he affected other people the way he did me; and whether this interest you have manifested in this great man as you have expressed it in this beautiful memorial and by this great occasion, is really heartfelt, or whether it is a perfunctory performance. I know it must be real, I couldn't think of it in any other way. I know some of you honor Dr. Miller, not so much for what he actually did, as for what he was; and I know the day is coming when you will know of him better, and will honor him for the work he has done, and I trust more also for the way in which he did this great work. You will honor him for the man that he was, and I am hoping that the work which he did and the life which he lived will be such a strong and powerful influence in this, his home state, as to cause Ohio to take the position to which she is entitled, of leader in all dental scientific work. You have already manifested strong symptoms in that direction. Ohio has always been a leader, as Dr. Brophy has well said, in every dental undertaking of importance. There is no state or people in the world more capable of taking this position of leadership, and I hope that the celebration of this occasion will instill into the minds and hearts of the men here present, the worthy, high, and noble ambition of taking up this work, and lighting their torches at this altar which Dr. Willoughby Dayton Miller has so worthily erected, and go on blazing the way to a greater glory, a glory that will re-act, not only to you personally, but to the profession and to the cause which we all love and honor, and which we hope will at last come into its own.

WILLOUGHBY DAYTON MILLER*

BY THOMAS P. HINMAN, D.D.S., ATLANTA, GA.

I ESTEEM THE OPPORTUNITY of making a few remarks at the unveiling of this memorial to our beloved Miller more than any honor that has ever come to me. The old adage, "the evil that men do lives after them; the good is oft interred with their bones," is not always true, for the good that Dr. Miller has done is a more lasting memorial than this statue. When time, the destroyer of all things, has left its mark upon this memorial, his works will still be known in the dental and medical professions.

The Bible says that "Greater love hath no man than that he lay down his life for a friend;" Dr. Miller has not laid down his life for a friend, but he truly sacrificed it to his profession. Dr. Miller was a great believer in organization and it is one of the great regrets of my life that he could not have seen the wonderful organization we have in this country, the National Dental Association, and have felt all its power behind him in his noble work and researches. It is an honor, not to be thought lightly of, that he was a native of the United States and the state of Ohio, and while honors were showered upon him abroad, his great boast was that he was an American dentist.

He was a man who gloried in the advancement of the dental profession and I have often thought how he would have entered enthusiastically into, and been a great supporter of and worker in our Research Institute, and I believe that his spirit is with us in every effort we put forth in research for the amelioration of human suffering. One of his co-workers and one of our greatest men has recently passed away and I believe at this time we should bow our heads in a silent benediction to the memory of Greene Vardiman Black.

The fact that we are able to honor Dr. Miller in this manner should encourage us to put forward every effort to stimulate interest in our great organization, knowing that, if he were here, he would put his stamp of approval on our efforts. Ohio should be proud of the fact that she was mother of this great character, and I believe the impress of his lofty manhood has made possible the enthusiastic support that the Ohio men have given the Research Institute of the National Dental Association.

No words of praise that I could utter; no human tongue could express the gratitude we feel that such a man has lived, and the influence of his life will remain as a glorious heritage to the American dentist. When his soul left this mortal body and the mortal put on immortality, I am sure his greeting above was "Well done, thou good and faithful servant, enter into thy rest."

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*An Address at the Miller Memorial unveiling, Ohio State Dental Society, Columbus, December, 1915.

"When Earth's last picture is painted and the tubes are twisted and dried,
When the oldest colors have faded, and the youngest critic has died,
We shall rest, and, faith, we shall need it—lie down for an aeon or two,
Till the Master of all Good Workmen shall put us to work anew.

And those that were good shall be happy; they shall sit in a golden chair;
They shall splash at a ten-league canvas with brushes of comets' hair;
They shall find real saints to draw from, Magdalen, Peter and Paul,
They shall work for an age at a sitting and never be tired at all!

And only the Master shall praise us, and only the Master shall blame;
And no one shall work for money and no one shall work for fame,
But each for the joy of the working, and each in his separate star
Shall draw the Thing as He sees it for the God of Things as They are!"
—*Rudyard Kipling.*

WILLOUGHBY DAYTON MILLER

BY PROF. GEORGE W. KNIGHT.

AT FIRST THOUGHT it may seem strange that an outsider should have any part, in the presence of this learned body, in paying tribute to one whose achievements in this world were all in a field apparently so specialized as to be almost beyond the appreciation of one who is not himself trained in that field. To this, however, the response may well be, that no one who had any real knowledge of, or acquaintance with, Willoughby Dayton Miller is out of place or out of order in any gathering, where the qualities and services of the man are being commemorated.

It is for me a great privilege to be able to speak a few words concerning "the man in the making." It happened that in the middle seventies of the last century, when I was a student at the University of Michigan, I was thrown in contact with Miller in a way which, as is often the case in college life, gave me an intimate knowledge and at least a fair understanding of the young man whose name and later services to the world are the occasion of this gathering today.

We were college mates, though not classmates, and members of the same college fraternity; he an upper classman, I an under classman; but class lines were largely ignored then as now among the members of a college fraternity, and so our intimacy was not the mere casual acquaintanceship which often obtains among college students. When I first knew him he was a young man of perhaps twenty-one or two, but with a dignity and bearing rather more mature than that of most men of his years; in appearance, straight, quite above medium height, with light, almost blonde hair; his face adorned with a yellowish-red beard, which after the fashion of the day he wore in the mutton chop or Burnside fashion; in dress and appearance always neat; in manner quiet and retired with a pleasant smile and friendly greeting for all acquaintances.

Among his fellows he was recognized as a man for whom the serious work of the college course was his first duty and business at the University. Though not at that time preeminent among his class for ability and consequently not a marked leader in the intellectual side of college life, he was nevertheless known as a hard, faithful, pains-taking and successful student. It is doubtful if many of his acquaintances would in those days have predicted for him the career which made his life contribute so much to the welfare of humanity, to the development of his profession and to his own personal eminence among the scientific men of his generation. Nevertheless, all that knew him felt confident that whatever task he undertook, in whatever field of activity he entered, he would do and do well that which the task or the field devolved upon him.

As a college man among college men, he never aggressively forced his opinions, or views, or judgments upon his fellows, but when his opinions or judgments were called for, they came in such clear and unmistakable form that we all learned to rely upon the sincerity of his views and the general correctness of his judgment.

In the days when he was an undergraduate student the college curriculum was not as flexible as it is now. The elective system was in its infancy and the old cast-iron courses of study gave little opportunity for the development of the special tastes or adaptabilities of the individual student. Consequently, there was little opportunity for Miller to begin that sort of specialization of his studies, which is in these later days too often afforded to the immature college boy. Nevertheless, even in his undergraduate days, as an examination of his college record proves, he showed the tendency toward the field of physiological investigation which formed the central theme and field of his life work. Miller was not regarded as a brilliant man; his name does not appear among those who were selected from his class as commencement speakers, under the then common custom of having the commencement exercises consist of a series of orations by selected members of the class. As these speakers were usually selected upon the basis of scholastic attainments as indicated by their college record, it may be inferred that he was not regarded by the faculty as among the ten ablest men in the class of more than one hundred graduates, thus again proving that the undergraduate career of a man is not always an evidence of what is in him or what he will attain in later life.

Several letters have come to me recently from his classmates and collegemates containing something of their recollection and opinions of Miller. One of these is from a man whose own name is prominent in the business world and in the legal profession—a classmate and fraternity brother. The writer's own life has made him a keen judge of men, and his estimate of Miller as a college student is so admirably expressed that it seems to me to give the best picture of the young student that can well be presented in words; it also shows clearly how and why Miller was later able to accomplish that which has made him rank among the great benefactors of the human race. He writes: "Miller was always modest and retiring, but always courteous and regardful of the proprieties of life and the rights of others. He was too studious to be attracted by the social amenities of the ordinary pleasures of college life. He took no part in and was not interested in so called 'College activities.' He was not, I think, regarded as a brilliant student, but he possessed in a higher degree than any other member of his class, a genius for continuous hard work. In his recitations he was always thoroughly prepared and never gave as an excuse the limit of time or the difficulty of the lesson. The task given him was cheerfully performed regardless of either the necessary time or work. If midnight oil was necessary, he burned it. His capacity for and cheerful willingness to work, brought to him an international reputation in his profession before he reached the prime of life. In this respect he surpassed every member of his class." To the correctness of this appreciation I can most heartily subscribe. He was perhaps not an easy man to become intimate with, but once his friendship had been won, it was firm and lasting and helpful.

Some fifteen years later, in the winter of 1890, it was my privilege, while a student in Berlin, Germany, to resume the acquaintanceship which had been interrupted when Miller was graduated from the University of Michigan, and during that winter I came to know him on another side of his life, his home and domestic life. He had by that time become a member of the faculty of the University of Berlin and was also engaged in his research work and in the active practice of his profession. His home life was beautiful, and the evenings which I was privileged to spend with him in his home with him and his wife and children are among my pleasantest memories of him. They showed that, as happens in so many thousands of cases in American life, the busy man of affairs or of professional pursuits, leaves the cares of his profession at the door when he returns to his home, and shares with his family those interests which have done so much to make American home life the most beautiful home life found in any country; and in the case of Dr. Miller it is evident that the intervening years after his college life had had a marked influence in making him more cosmopolitan, a little less immersed in his studies and had developed him into a splendid type of American professional manhood.

In conclusion, let me voice not only my own personal feeling, but the pleasure, the appreciation and the gratitude of the Ohio State University, that the beautiful memorial in honor of Dr. Miller has found its appropriate place upon the campus of the State University of his native state. You may be assured that the University appreciates deeply the honor which has been conferred upon it by this action on the part of the members of the profession, which Dr. Miller so highly honored and for which, as well as for humanity in general, he did so much for which the coming generations must always feel the deepest gratitude.

WHY ARE THERE TWO DENTAL PROTECTIVE ORGANIZATIONS?

BY GUY B. WEBSTER, CHICAGO, ILL.

SINCE THE RECENT PUBLICATION of the report of the Dental Protective Association of the United States, the question has been asked many times: "Why are there two dental protective organizations?"

When the Dental Protective Association entered into its agreement with Dr. Taggart, by the terms of which Dr. Taggart agreed to license its members to use the process disclosed in his patents for the sum of $15.00, and by which it agreed not to participate in, or contribute to, the defense of any dentist against whom Dr. Taggart might bring suit for infringement of his patents, there was brought about in the dental world a condition which is, in itself, an answer to the above question.

We quote from the article published in various dental journals, which is dated January 3, 1916, which, among other things, sets forth the status of the members of the Dental Protective Association with reference to the pending Taggart litigation:

> "The question is frequently asked: Where does the individual stand, with reference to the pending Taggart litigation, who is a member of this association in good standing and who did not accept the terms of the agreement with Dr. Taggart before the time limit expired? In reply to this important question we will say that every member was notified individually and through the dental journals, not once but several times, of the opportunity afforded by the terms of the agreement; and those who did not accept *forfeited their right to protection from this source, by this association.* They are hereby notified that they may either settle direct with Dr. Taggart, or *make whatever other arrangements they see fit to protect themselves from the Taggart patents.*"

The last sentence in the above quoted paragraph is the main reason and answer for the second dental protective organization.

After the agreement with Dr. Taggart was effected by the Dental Protective Association, and after the dentists of the country had been given a suitable opportunity to avail themselves of its privileges, if they so desired, and the time in which they might do so had elapsed, Dr. Taggart commenced a campaign to collect money.

Using round figures, about 10% of the dentists of the country availed themselves of the opportunity afforded by the Dental Protective Association, and the other 90% did not. There were just two things which this 90% might do: the one, to submit and pay; the other, to organize and test out the validity of the Taggart patents.

A group of Chicago dentists decided to adopt the latter course, and at a meeting held at the Grand Pacific Hotel in June, of 1914, The Dentists' Mutual Protective Alliance came into being.

The purpose of the Dentists' Mutual Protective Alliance is the protection of its members against process patent exploitation. While the immediate work in hand is the Taggart litigation, yet its real purpose is to be in the field, big and strong and ready to defend the dental profession against all those who have unadjudicated process patents to exploit. This position is assured by the provisions of its By-laws, which reads as follows: "No process patent shall be compromised."

Immediately after organization, the management of the Dentists' Mutual Protective Alliance took up the work of testing the validity of the Taggart patents. In this connection it may not be understood by all dentists just how or just what must be proven to invalidate a patent. When a patent is granted by the United States Patent Office, it is assumed that whatever is claimed therein is new or novel. If it can be proven beyond a reasonable doubt that whatever is claimed therein as new or novel was in use more than two years prior to the date of the patent, the patent falls.

The work of the Alliance has been to show that the processes disclosed in Dr. Taggart's patents, were in use more than two years prior to the date of his patents, or prior to 1905. To this end a case has been twenty days in court; the attorneys of the Alliance have visited most of the states of the Union from Pennsylvania to Arizona, getting together evidence; while the trial was in progress last June, they had more than 120 people in attendance, either directly or indirectly, as witnesses.

The trial lasted well into July, when it became apparent to the court that the end was a long way off, and he, therefore, adjourned the case until the Fall Term, subject to call. During the winter there have been several days of argument on motions, and the like, and it is probable that the main case will be called at an early date.

The present case is what is known as a test case, and an Appellate Court decision in the pending litigation will be, in effect, binding throughout the United States. Should Dr. Taggart be successful in this litigation, the question to those who do not have Taggart licenses, will be: "How much do you owe Dr. Taggart?" On the other hand, if the Alliance is successful, the Taggart patents fall.

This is said to be the largest and most important piece of dental patent litigation that was ever before a Federal Court for adjudication. The Dentists' Mutual Protective Alliance is the only organization in the field in a position to take the part of 90% of the dentists of the country in that litigation. This would seem to be a sufficient reason for the second dental organization.

SAVING GOLD*

BY W. S. WALTERS, D.D.S., W. LAFAYETTE, IND.

Frequently you have to remove a gold filling. The way you usually do that, there is quite a considerable, if not all, of that gold wasted, and so I figure that conscientiously and honestly and every other way, if that gold is lost in the usual way, and if you can save that gold you are entitled to what you can get out of it. Now, once in a while you get a big piece of gold out, but the most of it comes out in the form of gold dust. The whole secret of this thing is that you get your rubber dam in place, and you take a small piece of cotton about as large as a hickory nut and moisten it and lay it in the pouch made by the dam, just back of the incisors. All the drilling that you do, your patient being about in the position the way you usually operate, the gold dust will drop down on that cotton. Now, all that gold will adhere to that cotton. When you are through, remove the cotton and simply drop it into a box. When that is dry, all the gold is saved and removed from the cotton by rolling it between the fingers.

Now, while the one filling would not amount to anything, in the course of a year it becomes quite a saving to you. You may say that "that is the patient's gold." It was; but wasn't it always lost to them? And if I can save it, I consider it is my own. And if you are so conscientious about it and feel you are not entitled to it, if you can figure it out, you can pay the patient for it.

The other little stunt is the *use of varnish for synthetic filling.* You all realize that the odor of ether is very disagreeable, especially to ladies, because eight out of ten have been operated on at some time or other, and the odor is nauseating and the longer you have the bottle open the worse it is. Now, you take the cork of your varnish bottle and take an ordinary pin, and push it through from the under side and cut off the point of the pin. Bend the pin at right angles about one-fourth of an inch from the cork, put a little vaseline on the cork and it will not stick in the bottle, and it will keep the varnish from evaporating. Hold bottle in left hand so that the thumb rests on top of cork with the bent pin resting on top of the thumb nail; a simple movement of the thumb removes the cork and again replaces it, and your bottle is open just the minimum length of time.

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*Clinic Northern Indiana Dental Society.

MEDICAL TREATMENT OF EXOPHTHALMIC GOITER

Dr. S. R. Pietrowicz (*Journal A. M. A.* January 8, 1916) reported that a large proportion of patients of the milder type, would recover, if given absolute rest, both mental and physical, with addition of partly forced feeding, and the removal of pathological foci in the oral cavity, which latter seems to have a direct etiological relationship to the disease.

CORRESPONDENCE

A LETTER FROM BUFFALO

BY DR. J. W. BEACH, BUFFALO, N. Y.

We are glad to give the readers of THE SUMMARY a short report, of the sixteenth annual meeting of the Alumni Association of the Department of Dentistry, University of Buffalo, February 18, 1916. The program was exceptionally good, the first paper being presented by Dr. Elmer S. Best, Minneapolis, entitled, "The Complete Technic Involved in the Three Classes of Pulp Canal Operations."

It is a most timely subject and truly is fundamental in character. Somewhere in the back part of our brain cavity there is stowed away an all-but-forgotten reflection about a "house built on the sands." That reference, it seems to us, is as applicable to pulp canal surgery as it was to the original text. We can conceive of no worse dental service than inadequate treatment in this particular field. From the gingival line to the occlusal surfaces we can see what has been done, but beyond that it requires the all-seeing eye of Rœntgen to uncover the dentists' slothfulness or to prove his excellence. Stronger language would, perhaps, better apply. We have remarked before that, could the public at large know of the fifty-seven or more varieties of junk, et cetera, they are toting around within the hidden confines of their jaw bones, we might receive a shock that would make the Hunter upheaval look like a fly-blister on a graven image.

The Hunter hit us just where we needed it and none too soon. We thank Providence his aim was so true and telling. In consequence, we have become hunters for the best and most efficient means of ensuring the safety of our patients in this work. We have been filling roots altogether too long with ostensible integrity. Let us amputate the ostensible and pin our faith to integrity alone.

Every action, every characteristic, every word of Dr. Best emphasized this principle and impressed his listeners with the correctness of the splendid technic which he employs. He made plain the responsibility we assume and placed guide posts along the road to success. He advocates conservatism in destroying pulps and told us that our greatest problem is with the tooth that has been pulpless for some time. Avoidance of pain has led us to employ several means of relief that are very beneficial, while in others there is a grave element of danger. He particularly mentions Nitrous Oxide and Oxygen Analgesia as being a pernicious method, except in the hands of a very few skillful operators. This is a timely note of warning as the method might prove a fruitful source for recruiting the ranks of the dead ones.

He says; "a pulpless tooth is not quite as good as one with a healthy pulp." Surely, this must be true for the Great Builder supplies us with nothing which is not useful in our cosmic constituency. The doctor contends that, although we are duly qualified practitioners of dentistry, we have a meagre conception of the real significance of asepsis and that we have been guilty of following the habits of the real offenders in at least three of several ways, to wit: "not using the rubber dam; wrapping unsterilized cotton from open cotton holders on smooth broaches and placing them in the pulp canals; and sealing canals with cotton or porous cement."

He strikes from the shoulder when he says that, "The habit of opening into a functionating internal organ, such as we find in the case of the vital dental pulp, without a working knowledge of aseptic precautions and strict application of the same, is a crime against humanity and the tragic part of it is that it is the innocent who suffer." He aptly distinguishes between the man who uses dentistry solely as a means of livelihood, and the one who goes further and endeavors also to improve dentistry as well as himself. Hope of real advancement rests entirely with the latter class. He observes that some men do poorer operations after they leave college than before, because many men must be under the surveillance or guidance of superiors. He wants to know how many of us belong to this class. Don't all speak at once; one at a time, please; it's hard to count so fast.

With characteristic gentility of touch, he rubs it in a bit when he asks how many of us make excuses for our work, and deplore its imperfectness when the other fellow unexpectedly gets a squint at it. Dr. Best throws in a little dash of really human humanity, suffusing the whole panorama with a softening glow that makes our pet weakness less glaring than before. At any rate, you know what we mean. He seems to think, and with good reason, that if we cut corners in doing our work above ground, we are likely to cut much more in the trenches. We concede that he has the best part of the argument and an ardent plea goes with these few words that the seen and the unseen be treated alike, for Roentgen sees everywhere.

He throws a shrapnel into the enemy's camp when in a quotation he says that the layman will seek as his dentist the man who will look after his health instead of the fellow who wants to decorate him. It surely is about time the better element of our great profession puts the kibosh on that hoard of interior decorators who infest Sixth avenue and like Marts of the Golden Crown. It looks as if they were in cahoots with streptococcus veridens also, and are working full time to help swell the hundred thousand helpless souls, who it is averred, annually meet an untimely end through infection from pulpless teeth.

We believe his quotation that good bridgework is a luxury for a gasoline magnate and also appreciate the quip of our old friend, Ottolingui, that "Your state board license permits you to practice dentistry; it does not compel you to." Perhaps not, but the butter, eggs and cheese man does, not forgetting the kindnesses imposed by the Standard Oil Company. However, Otto always was fond of his little joke.

Dr. Best mentions an illustrious galaxy of high lights in the dental and medical fraternities who have sacrificed themselves for their professions, but in connection with root canal treatment none shine with greater refulgence than Cincinnati's Callahan, for did not he open the way into hidden and mysterious paths that we might follow, to the honor and glory of good dentistry? 'Tis said that the smallest thing in the world is the nit on the gnatt's back, but we are from the vicinity of St. Louis and wager that the one who made that statement never tried to find *some* pulp canals. Try the Callahan way and never rue the day.

We might ramble on, ad in fin, in an attempt to discuss the instrumentation, medication, filling, etc., which was so capably presented by Dr. Best, but we beg to have recourse to that illustrious saying of the great Rudyard: "But that is another story." When you read Dr. Best's paper you will adopt much therein that will be of great value to you and redound to the credit of one of our most proficient workers in this field of continuously recurrent difficulties, and we look to him to be one of the very few who will bring about the most needed reform in root canal surgery—the standardization of therapeutic and operative procedure.

"Pyorrhea Alveolaris," with moving picture film; Joseph Head, Philadelphia, Pa. Like the pie and the finger bowl, Dr. Head was saved until the last, just to keep the boys sticking around as long as possible. It worked like a Ford, for the audience room was filled. We will not attempt to enlarge upon the well-known qualities of Dr. Head for no doubt he is satisfied with his present size. However, he brought to us a message of hope and salvation for the teeth which is founded on the most practical and simple basis. He deplored present conditions wherein physicians are ascribing nearly every pathological state to bad teeth. Even the child who speaks disrespectfully to its parents must do so because of bad teeth. At any rate, bad things come out of the child's mouth.

He has an ingrown hunch that the average X-ray is little better than a shadowray, as it were, that it should be given the Nobel prize for what it don't show. So say we, Joseph, and any time you feel like starting something you can't stop, just tell that to Leumen Waugh; but take our advice and have your bomb-proof helmet securely attached or the head of the family may be out of a job. The use and abuse of the X-ray would make a three reel performance daily for a month.

Dr. Head puts the embargo on the brig "Pyorrhea," and we would not ask Wilhelm to settle if he should sic a sub onto it and sink it for all time. It has always been a poor old hulk without port or harbor and we believe Dr. Head's supplemented cruiser, "Mouth Infection," can carry all the cargo without a list. Personally, we are on the side of Joseph, for it is common sense. Pyorrhea has been a public bugaboo long enough and when complicated "with moving picture film," as per Dr. Head's title, it might cause serious results. But speaking of motion pictures, the doctor surely has prepared a splendid series showing different conditions of mouth infection and the various little wigglers that are implicated, also a demonstration of correct brushing of the teeth and gums that was very instructive and entertaining. Dr. Head employs a short brush with short bristles that permit of freedom in its use. The brush is carried back of the third molar and drawn forward over teeth and gums and not antero-posteriorly. This is repeated several times respectively in the four corners of the hash condenser, after which you are supposed to be fit to appear in polite society. Of course you have heard of Billy Sunday's famous excitability song: "Bright in the corner where you are." It is sung on the installment plan in the four corners of the tabernacle, much after the style of Dr. Head's method of brushing teeth. If either stunt was patented, the other one would be an infringement.

Dr. Head is writing a book exploiting his ideas and we are pleased to endorse practically everything he says, for our profession has never produced a more enthusiastic, sincere and honest man than Dr. Joseph Head. This is not a paid advertisement. We cease our remarks fearing lest we take all the glory out of his efforts and leave him without new material for his book.

Donald Mackay Gallie: Who doesn't know him! If you don't, just deduct 33⅓% from your acquaintanceship list. To know him once is to know him always, and to enjoy the scintillating brilliance of his well-stocked wit is indeed a privilege that kings and queens and even jack pots might envy. Dr. Gallie was the star performer at the Alumni Association banquet held during the meeting, and his monologue act evidenced the possession of unusual histrionic ability, both natural and acquired. In other words, he put it across in good shape and got away with it like a canal mule with a mess of oats. A hearty, whole-souled, grown-up kid who will have a sixteen year old spirit at ninety and who is loaded to the brim with the joy of life and of its living, who is too vigorous for indigestion and dyspepsia, too hearty to pass up a good meal without regret and too good a scout to stick an icicle down the back of Effervescing Mirthfulness. At any rate, he gave us an excellent talk loaded to the brim with good sense and fun, all of which was received with great acclaim by the assembled recipients. When the orchestra played "Illinois," he nearly split his throat with its surging melody, and the ease with which he fooled around some of its seventeenth story notes, was truly marvelous. Chicago, will hear from him yet; he is a coming comer. Unofficially, we wish to announce the expressions of pleasure heard on every side, and the sincere appreciation of the association for his assistance in the success of the meeting, which will be his to the end of his journey.

The clinics were excellent and much might be said of them but we will spare you further rambling of this sort; however, a streak of light pink makes a decided contrast to the profound shades that typify abstruse scientific literature and helps to keep the brain from bursting its bonds.

A CLEFT PALATE CASE

BY VETHAKE E. MITCHELL, D.D.S., NEW YORK CITY.

To the Editor of THE DENTAL SUMMARY: There appears in your January issue, an article entitled "A Cleft Palate Case," to which I should like to reply, if you will give space in some future issue of your magazine.

The great majority of your readers are general practitioners, and to them the sum and substance of Dr. Speer's article, is simply this: "Do not inflict upon your cleft palate patients a germ-breeding, rubber vellum appliance; advise an operation; I have operated on case No. 1, and he is now able to speak, so as to be understood."

Case No. 1, I presume, means his first case, and as no others are mentioned, possibly the only one, operated upon not much more than a year ago, and the result obtained, which in his own words, "He can now talk to strangers and be understood," is hardly sufficient evidence for his condemnation of the rubber appliance, which he does in these words; "I think I have a greater advanced idea and am sure the results obtained are so far superior that it would be a farce to compare them."

Now the results as stated in case No. 1, are far from satisfactory under any method of treatment.

The ideal is to improve the speech to such an extent, that it is impossible to detect any defect.

This is possible in most cases, with a mechanical appliance, when properly constructed.

The rubber vellum, or soft rubber appliances, I have always considered to be un-hygienic and irritating to the tissues, but when *metal* and *hard rubber*, only, are used in their construction, they are not germ breeders, and can be kept as clean as any mouth or the nasal passages.

In the treatment of cleft palate, whether surgically or mechanically, a thorough knowledge of the tissues concerned, and their functions, is vitally essential, to bring about a successful result.

Lack of this knowledge is probably the cause of so many failures.

As an adult patient is seldom concerned as to the improvement in his general health, but is concerned in the improvement of his speech, I shall only consider that phase of the subject.

The speech mechanism is defective. Tissues with very important functions are missing. In some cases, a large part of the soft palate, uvula, hard palate and vomer bone.

To expect perfect results, it is not only necessary to restore *all* these tissues, but in such a manner that the functions also are restored.

When this is possible surgically, by all means operate.

It is just as important to restore conditions in the nasal passages as it is to restore the roof of the mouth.

The soft palate is one of the most important organs in the production of speech. Its functions are concerned in the changing in shape and size of the resonating spaces, both oral and nasal affecting the tone of the voice; hence the difficulty in its restoration, permitting the delicate muscular activity.

Speech and voice are produced by the same mechanism, the only difference is "tone."

Perfection in either is the result of education, but there is a vast difference in the degree attained, even in normal individuals.

After a number of years in this work, I fully believe that in the great majority of adult cases, a greater degree of success is attained by the use of a mechanical appliance, such as I presented to the profession, a description of which was published in THE DENTAL SUMMARY August, 1913 and the *Dental Digest* October, 1913.

17 E. 38th St.

CLEFT PALATE SURGERY

BY G. B. SPEER, D.D.S., LOS ANGELES, CAL.

AFTER HEARING SOME COMMENTS for and against my paper published in THE DENTAL SUMMARY—January issue, I again take up my pen in defense of operations and of early operations as best for good results.

It has been advised as against the operations, that there could be made an artificial substitute that would have an advantage over an operated case. Now, I am sure I would rather have a badly deformed leg or arm of my own than the best artificial substitute ever made and they make some good legs and arms with hands. You can by practice pick up a penny from the floor, but they are not a part of you; they do not feel; and they are a constant source of trouble to the wearer. All artificial substitutes must be replaced and repaired; they are all right for the other fellow but excuse me.

Now, for the missing tissue: Do you think that tensor palate muscle is missing? No, it is there; you can see it in action, but it looks short; and it is, so with any other muscle with one end unattached, and remember this is a double function muscle, and it is very necessary for the palatine end to be attached to its fellow from the opposite side so that its posterior attachment may do its proper function in relation to the eustachian tube—thereby assisting in perfect hearing and it would be impossible to get a proper function of this muscle by using an artificial substitute for a palate.

If you were to make an incision in a muscular tissue you would have a spreading apart of the edges of that incision, but there would be no missing tissue and if you were to accidentally split the soft palate, it would spread apart, leaving a cleft. Now, would you repair that tissue by an artificial substitute, or would you suture it together, thus restoring it to normal? I am sure you would take the surgical method.

Now, you say a congenital cleft is a different one, but it is not, only it is of longer standing, and the longer it stands the worse it gets, no matter if from accident, injury or birth, and that is all the more reason for an early operation.

A short time ago a nurse who was not assisting in the operation, but who was on duty before and after the operation, remarked that she could not see where I secured a sufficient amount of tissue to close the large fissure, but it was closed with no lack of tissue, and I told her it was already there—all I did was to make use of it.

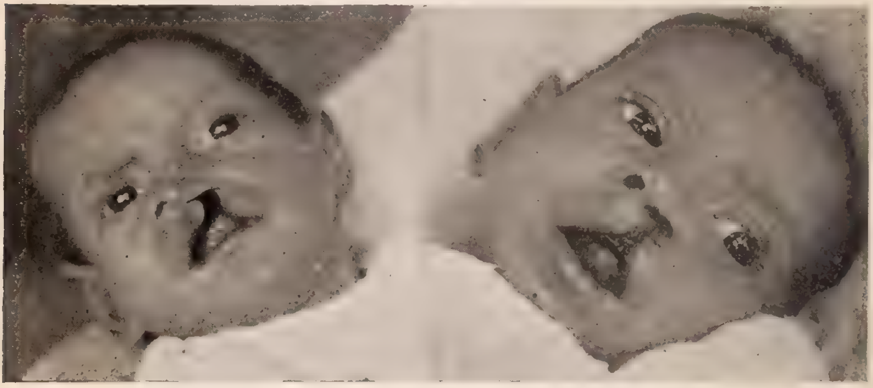

Fig. 1 Fig 2

The only lack of tissue that I have come in contact with was where same was destroyed by former operations, and I have had to use a part of the anterior pharyngeal muscles in order to secure a fair result. This is a case of "robbing Peter to pay Paul!" But half a loaf is better than none.

As to the cause of cleft palate we have no certain knowledge, but we do know that whatever the cause, it must be in early foetal life and I do not think maternal impressions are the cause. I will take up your time with but one of many cases.

The mother of a child that had a bad case of cleft palate and hare lip, was greatly worried when she again became pregnant, and said *that* shock alone was bad enough, but when her friends added their beliefs, and told her all the discouraging things they could think of, she just looked forward with absolute certainty to a second deformed child, and said she could think of no other result; but the child has a well formed mouth and is now the mother of a well formed child herself. This woman says, if maternal impression were possible, she surely would have had another cleft-palate baby

Until some better theory is brought forward, I will hold to the idea that the position of the tongue and the pressure of the mandible are the chief factors in cleft palate.

The narrowing of the arch has been brought forward against early operations, but if we have a narrow arch, why not treat it, just as you would any other case of narrow arch? I would not hesitate to expand any narrow arch; I would not hesitate to make a narrow arch and after securing a good, bony union expand it to any necessary width, if by such procedure I could secure a good normal shaped mouth, and I would consider it a vast improvement over any mechanical substitute ever made. But I do not think it necessary to expand arches from this cause any more than from other causes, and in support of this assertion let me introduce two pictures of the same child taken some four days apart. They show the effect, or rather the results, attained by approximating the maxillary bone.

Now, one of these pictures must be abnormal, and you can judge for yourselves, which it is. Now, these pictures will bear study and thought, Note carefully the length as compared to the width of each face; note carefully the width across the maxillary bone, just below the nose. In No. 1 the maxillary bones would telescope the mandible passing down outside, and the separation of the maxillary bone was about three-fourths of an inch, while in No. 2 the separation was closed, the bones being approximated and wired, and the maxillary bones in their proper relation to the mandible. Now, will this child have a narrow arch? I think not, for it is the proper width now, and I see no more reason for a narrow arch than in any other child.

These pictures are ample proof to me of the abnormal width of the maxillary bone even if I had not seen the case itself, and as further proof of early operations, let me point out the fact that this child weighed less at three months old when I first saw her, than when she was born, weighing seven pounds, thirteen and one-eighth ounces, and lost 2½ ounces the day of operation, but gained $4\frac{3}{8}$ ounces during the next twenty-four hours. And at the end of the first week had gained $13\frac{3}{8}$ ounces, and has been gaining steadily ever since. Is that not a good record of argument in favor of early operations?

I think so, and you can look again at the picture and judge for yourself of the result of early operation.

Story Building

The Army and Navy Register of January 29th, page 132, first column, detailing the hearing of General Gorgas, Surgeon General of the Army, before the House of Representatives Military Committee, announced that the new legislation, approved by the War Department, contemplated promotion for Dental Surgeons up to and including the grade of Major; that there was increasingly important functions for Dentists in the military service, etc. Urge your representatives in Congress to support these bills and do it *at once*.

MISCELLANY

THE BOSS'S WIFE COMES TO THE RESCUE

BY THE OFFICE BOY

ONE DAY SAYS THE BOSS, "James, there's a new erie goin' to be inaugurated in this office. I've settled on what you might call a system of fines fer pestiferous patients. First, there's them that takes their case in their own hands, and tells you what to do, an' you mustn't do this and you mustn't do that, an' all they want is fer th' tooth to be stopped achin', anyways, it mustn't be achin' jis' at present, 'cause they've got something important to attend to. An' yet it mustn't be touched.

"Then there's th' kind that says they wouldn't on no account go to no other dentist, an' please do this job as cheap as you kin, an' I'll pay you when I kin.

"Them two kinds has got to be heavily fined, James. In short, James, my idee is to dispose everlastin'ly of pests an' nuisances that seems specially ordained to drive dentists crazy. Of late I've subscribed anew to th' doctrine of a personal devil, James; the kind that besets dentists. Th' doctrine is sound all right, James.

"There was Mis' Knox, James, you remember. She come in a year ago an' says she, 'Dock, I can't have this tooth achin' jis' today, 'cause I've got friends comin' t' dinner, an' it wouldn't do, oh, not at all, don't you see? So you fix it temprary, an' t'morrow I'll come in an' have it done right. Then she never come for two months; an' in short, James, I treated that blamed tooth four times within a year, an' finally sending her a bill fer two dollars, she sent word back my charges was something frightful, an' anyhow she'd had a city dentist pull it out an' he'd said any dentist that would neglect a tooth thataways had orter have his diploma took away, an' she wasn't agoin' to pay no attention to my bill, an' I was lucky to not have her prosecute me fer malpractice. Later I heered her husband said I was a derned quack, an' he'd a notion to call me out an' drop a bunch o' fives on my proboscis."

While the Boss was talkin' here come Judge Brown an' Mis' Brown, an' th' Judge explained how she wanted somethin' put in a achin' tooth, an' it mustn't on no account be achin' jis that partic'ler afternoon, 'cause she was entertainin' th' sewin' circle of their church, an' th' tooth mustn't be touched, it bein' so tender, an' no ordinary handlin' would answer fer this case, an' so on. (For th' land's sake, reelin' it off jis' like th' Boss had been tellin'.)

So th' Boss looked at it, an' he said th' nerve was probably dead, so he syringed it out with some cold water, not havin' any warm handy, an'

Mis' Brown she let out a yell like a auto bustin' a tube. Th' Boss he looked awful surprised, an' Mis' Brown she turned an' looked implorin'ly at the Judge, like they'd had it all made up in advance, an' she was sayin': "Now is your time; go ahead an' do it to him." The Judge, says he, "Seems like a middlin' lively dead nerve, don't it?" an' looked like he does in court when he says, "Fifty dollars fine an' thirty days in th' workhouse."

While they was waitin' fer it to stop achin' th' Boss told th' funny story about th' mud turtle what had had his head shot off an' nex' mornin' Pat an' his wife seen it walkin round in th' yard. An' says Pat, Mary Ann, th' crather's dead but he's not sinsible av the' fact." An' that was th' way it was sometimes with teeth, th' Boss explained. Th' Judge looked awful severe, so th' Boss stopped laffin' an' looked reprovin'ly at me, like I'd done it. Then he explained how th' odontoblasts was probably supperatin' an' th' exposed surface of the nerve covered with pus-exudate er somethin' and he'd got to cut that away awfully quick an' while it might hurt, in a instant he'd pop in some novocain an' whiff! away would go th' pain. But the Judge reminded him what he'd said in th' start, about not handlin' it, an' wantin' it stopped only for that afternoon, an' so, in short, th' Judge decided, all things considered, it wasn't best to fool too much with it; an' they'd best not have no cotton an 'clove oil ner nothin' put in fer fear o' making things a lot wuss. So then they went out, after about another half hour.

Then the Boss says he: "James, that's jis' th' kind o' cases I was tellin' you about; people takin' their cases into their own hands. Blamed ef I don't wish I'd fined th' Judge five dollars. I'll git even with them two yit. You jis' watch me. I hope her blamed tooth will ache some more."

Well, th' Boss got his wish all right. Two er three hours later, about th' time sewin circles is supposed to be goin' full whoop, here come Mis' Brown an' th' Judge, an' about twenty women an' girls, all lookin' like it was a bad mess fer th' Boss, and th' Lord help him once th' Judge got started. Th' Missis it seemed had heered th' Boss boastin' about what he'd do, an' so now she seen them folks acomin', an' she poked her head in th' door from th' dinin' room and says she, "I'm a goin' to have somethin' ter say when them folks arrives. You've got a lot o' courage stowed away that you never seem to know how to pull on folks at th' right time. Leave this case to me; do you understand?"

So then th' Boss he stood ca'am as you please waitin' like he knowed it was a committee comin' to present him with a Chiny-set er somethin. Th' women an' gerls come in first, saying nothin', formin' a circle in the reception room. Th' Judge seated th' sufferer in th' midst, an' then he turned to th' Boss. Says he, "It certainly does seem most eggstryornery, Dock, that after all my cautionin' an' instructions to you, you could not have done better than you did concernin' Mis' Brown's tooth. I have to report that it has been achin' constantly since we left this place, two hours ago. What—*what* explanations have you to offer, sir, of this?"

Jis then th' Misses she come in th' operatin' room an' took a stand by th' Boss's cheer. "Have Mis' Brown come in at once," she said, addressin' th' Judge. She didn't seem th' least impressed by his manner; instid o' that, th' Judge he seemed to feel instantly that th' Missus meant business all right, an' they'd got to mind.

So while they was fixin' Mis' Brown comfortable in th' cheer, th' Missus explained that she often helped th' Boss, an' havin' sharpened a spoon excavator, she explained that she was goin' to hurt a little, an' it wouldn't last but a few seconds, an' then she pulled Mis' Brown's head firmly back payin' no heed to her gaspin', "Wait a minute," an' quicker than forked lightnin' she had that pulp scooped an' bleedin' an' before the patient could yell twice, had a cylinder of novocain pressed in on it, an' within three minutes she had th' entire pulp twisted roun' the shank of a Donaldson broach. Then she squirted ice water in th' tooth, an' Miss Brown never flinched, and says she, "Isn't it wonderful?" an' th' Missus said it was, as wonderful as it was that folks that don't know nothin' about dentistry will presume to tell a dentist what to do an' what not. That was comin' mighty near home, an' th' Judge he took it up at once, an' said, did she mean him by that? An' th' Missus she never give th' least bit o' ground, but she said she meant him an' Mis Brown, an' any an' er'rybody th' description fitted. So then while she was about it, she give a fling at folks that seems t' think they needn't have toothache exceptin' when it was handy, an' she suggested kind o' sarcastic, that the nex' time any o' them got took down with mumps er typhoid, they have th' family doctor postpone it till a convenient time.

Ev'rybody looked awful solemn when she said that, not seemin' to understand it wasn't only a joke. Then th' Judge kind o' give th' signal, an' they all began goin' out. But th' Missus says she, "Hain't you sort o' forgot somethin', Judge?" An' he started lookin' like he didn't understand, but she kep' lookin' reel firm, an' so he took out a ten dollar bill, lookin' hard an' lovin'ly at it. Then finally he handed it to her sayin': "I reckon you kin change that?"—like he hoped she couldn't. But it seemed she was all fixed for him, an' she turned to th' Boss's register an' says she, "There seems to be another dollar comin', Judge, this charge bein' three dollars, an' an' outstandin' bill here on th' book bein' eight dollars. It's been standin' a year, an' I reckon th' Doctor fergot it."

Th' Judge he never made no motion to fetch out that other dollar, but th' Missus she kep' lookin' at his pocket so kind o' greedy an' unrelentin' that he had to hand it over. He'd got middlin' red in the face by this time, an' he said, kind o' short, "Gimme a receipt." Then he led th' procession out, like they was follerin' th' corpse.

After a spell says th' Boss, "You never made no appointment when she was to come back," an' says th' Missus, sort of bland, "Hain't you had enough experience to know when patients is over-ripe? She hain't agoin' to come back."

EDITORIAL

CROSSING THE DEAD LINE IN DENTISTRY

The "dead line" threatens the prosperity of almost every individual, no matter what his vocation or avocation. It is no respecter of persons or age. We have known young dentists, fresh from college, who crossed the "dead line" in the early years of practice. We also have known dentists who have attained an age of more than three score years and yet have never reached the "dead line" in their professional career.

The "dead line" may be defined as the life meridian at which the advancement possible to an individual is arrested and he ceases thereafter to develop.

Silently as a shadow it may cross your path if you are not watchful, but it will recede, like a rainbow before your approach, if you are master of the ground on which you tread.

"Eternal vigilance," said Thomas Jefferson, "is the price of liberty," and we might say that eternal vigilance is also the price of this mastery.

Probably the best way to keep from crossing the "dead line" is to take an occasional, impartial, personal survey of your actual condition and then set about to correct any faults or deficiencies found existing. Ask yourself such questions as the following:

Am I keeping up with the progress of the profession as recorded in our dental magazines and revised text-books?

Am I familiar with the newest methods of practice?

Do I dread new undertakings instead of being ambitious to conquer them?

Am I determined to perform better operations in the future than in the past?

Am I keeping my office equipment and furnishings in first-class condition?

Is my physical condition as good as I can make it?

Am I constantly on the lookout for things that will help me to help my patients?

Am I always giving my patients value received in operations?

Am I as particular about my personal appearance as I should be?

Am I rigidly observing all the rules of asepsis in my practice?

In fact am I doing everything I can to give my patients most efficient service?

And many more similar questions could be asked. An occasional investigation of oneself should prove beneficial.

The more rapid the advancement of dentistry, the greater the requirements of the dentist.

The American Journal of Surgery for February contains an editorial entitled "Concerning the Teeth." Among other things it says:

"The up-to-date dentists are now teaching the surgeon some of the things that must have a profound influence on surgical practice. It is obvious that, among other things, not only must the dentist make Roentgen-ray pictures of the teeth and alveolar processes, but the surgeon also must have this information in all cases of doubtful infective origin.

Modern dentistry is taking a step in advance of general surgery. It has taught us that the teeth are the sources of infection in many diseases in which we have been satisfied to treat the symptoms because we did not know that there was anything else to treat. It is now teaching us that infection associated with a foreign body, such as a dead tooth, may not be treated and cured without removal of the foreign body.

The time has now arrived when no hospital, or clinic, doing general surgical work, can be regarded as being upon a scientific basis unless it has a dental department, with facilities for the finest Roentgen-ray examination of the alveolar processes and facilities for treating the infections which are associated with the teeth."

The investigation, by both physicians and dentists, of systemic infection from pathological conditions in the oral cavity, has brought dentistry into the lime light. The eyes of the medical world are upon us. The ears of the laity are open. Dentists must not remain inactive. Grave problems must be solved and dentists must solve them.

Much is expected of the dentist now and more will be demanded.

The dentist who is not strictly up-to-date in theory and practice should apply himself until he is.

The "dead line" is dangerously near many a dentist at the present time and it is only through his individual efforts that it can be avoided.

Don't be a dead one.

Here's Another

My dentist is a mild-eyed man,
Tender of heart and soft of palm,
Who draws me in whene'er he can
To his loving grasp,
To gouge and rasp.

He seats me in a cushioned chair,
Twists my jaw and musses my hair,
All of which is easy to bear,
But, oh, the roar
Of the electric bore.

I never complain, nor gainsay the truth
Of the luxury of a gold-filled tooth,
Or silver or platinum, forsooth,
But sight of the bill
Brings on a chill.

—*Elizabeth Gregg.*

SOCIETY ANNOUNCEMENTS

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing June 12th, and continuing six days. For application blanks and full particulars address Dr. Fred J. Prow, secretary, Bloomington, Indiana.

Vermont Board of Dental Examiners

The next meeting of the Vermont Board of Dental Examiners, for the examination of candidates to practice in Vermont, will be held at the Statehouse, Montpelier, commencing at 2 P.M. on June 26, 1916, and continuing for three days.

To be eligible for examinations a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, and (3) a graduate of a reputable dental college.

Applications must be in the hands of the Secretary not later than June 16.

For further information apply to Harry F. Hamilton, Newport, Vermont.

Program of the Section cn Stomatology of the A. M. A.

DETROIT, MICH., JUNE 12–16.

TUESDAY 2 P.M.

1. Symposium on The Principles Involved in Chronic Mouth Infections in their Relation to General Diseases.
   - (a) Dr. Frederick B. Moorhead, Chicago, Ill.
   - (b) Dr. Frank Billings, Chicago, Ill.
   - (c) Dr. Edward C. Rosenow, Rochester, Minn.
   - (d) Dr. Ernest Irons, Chicago, Ill.

WEDNESDAY 2 P.M.

2. Symposium on Interstitial Gingivitis and Pyorrhea Alveolaris.
   - (a) Bacterial Findings........ Dr. A. W. Lescohier, Detroit.
   - (b) Anaerobies in Pyorrhea Alveolaris { Dr. Anna W. Williams.
Dr. Caroline Rosenberg.
Dr. Charlotte VanWinkle.
New York, N. Y.
   - (c) The X-Ray in Diagnosis. Dr. Hollis Potter, Chicago, Ill.
   - (d) The Importance of a Correct Differential Diagnosis of the Predisposing Causes ...... Dr. M. L. Rhein, New York City.

(e) Some Studies in the Treatment of Pyorrhea Alveolaris.
Dr. Geo. B. Harris, Detroit.

(DISCUSSERS)
Dr. Arthur Black, Chicago, Ill.
Dr. Joseph Head, Philadelphia, Pa.

THURSDAY 2 P.M.

3. Ankylosis of the Temporomandibular Joint.
Dr. Chalmers J. Lyons, Ann Arbor, Mich.

(DISCUSSER)
Dr. John B. Murphy, Chicago, Ill.

4. A Clinical Pathological Study of Malignant Conditions about the Face, Mouth and Jaws............ { Dr. John W. Means, Dr. Jonathan Foreman, Columbus, Ohio.

5. Surgical Procedures Enhancing the Retention of Artificial Dentures, with Report and Illustrations of an Unusual Case.
Dr. Herbert A. Potts, Chicago, Ill.

6. A Study of the Lymphatics of the Dental Pulp.
Dr. Frederick Noyes, Chicago.

Chairman—Dr. Frederick B. Moorehead.
Eugene S. Talbot, secretary.

Pennsylvania State Board

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in the Musical Fund Hall in Philadelphia, and the College of Pharmacy Building in Pittsburgh, on Wednesday, Thursday, Friday and Saturday, June 14, 15, 16 and 17, 1916. The practical work will be held at the Philadelphia Dental College in Philadelphia, and the University of Pittsburgh in Pittsburgh, on the first day, Wednesday, June 14; the operative work being held at eight-thirty A.M., and the prosthetic at one-thirty P.M.

It will be necessary for any applicant repeating his examination to take the practical work over as well as the theoretical. Application papers may be secured from the Department of Public Instruction, Harrisburg. For further information apply to Alexander H. Reynolds, 4630 Chester Ave., Philadelphia.

South Carolina State Board

The next meeting of the South Carolina Board of Dental Examiners will be held at Jefferson Hotel, Columbia, S. C., beginning at 9 o'clock Wednesday morning, June 14th, 1916.

R. L. SPENCER, *Secretary,*
Bennettsville, S. C.

North Carolina State Board

The next regular meeting of the North Carolina State Board of Dental Examiners will be held at the Battery Park Hotel, Asheville, N. C., beginning promptly at 9:00 o'clock on Monday morning, June 26th.

All applications must be in the hands of the secretary ten days prior to the meeting.

For further information and application blanks address the secretary, F. L. Hunt, Asheville, N. C.

The Georgia State Dental Association

The forty-seventh annual meeting of the Georgia State Dental Association, will be held at Macon, Ga., June 8th, 9th and 10th, 1916, beginning at 11:00 A. M. Thursday, June 8th.

The Program Committee is making preparations to bring to this meeting some celebrities, who will give illustrated lectures on some very important topics concerning the dental profession; also same men will give clinics which will be more than interesting to all who attend the association. Besides these men, there will be a program of merit given by local dentists.

All ethical dentists in Georgia are respectfully invited to attend, and become members of this great State Association. We extend a most cordial invitation to the members of other associations to meet with us.

For further information, address the Secretary.

Dr. M. M. Forbes,
803-4 Candler Bldg., Atlanta, Ga.

The Louisiana State Dental Society

LAKE CHARLES
LOVES COMPANY

The Louisiana State Dental Society will hold their annual meeting in Lake Charles, one of Louisiana's most picturesque cities, beginning May first, and running through until the third day of the same month.

An exceptionally unique, interesting and instructive program has been arranged, and all visiting ethical dentists as might desire to attend are cordially invited.

The date of the meeting has been so advanced in order that exhibitors will not find the dates conflicting with those of the neighboring States, and that nearby dentists will be able to take advantage of this splendid meeting.

J. Crimen Zeidler, *Secretary,*
Suite 1129 Maison Blanche Bldg.,
New Orleans, La.

Nebraska State

The Nebraska State Dental Society will hold its 49th annual meeting May 15th, 16th, 17th and 18th, at Lincoln. Headquarters will be at The Lindell Hotel.

H. E. King, *Secretary*
Bee Bldg., Omaha.

Michigan State Dental Society

The sixtieth annual meeting of the Michigan State Dental Society will be held in Detroit, April 13, 14 and 15, 1916. Dr. F. B. Moorehead, of Chicago, a short-paper series and an ex-presidents' day, will feature the program. The meeting will be the largest and best in the history of the society.

Write Dr. Wm. H. Elliott, 1539 Jefferson Ave. E., Detroit, for space reservation. Dr. O. W. White, 406 Fine Arts Bldg., Detroit, will mail programs to non-members upon request.

C. G. Bates, *Secy.*,
Durand, Mich.

Northern Ohio Dental Association

The annual session of the Northern Ohio Dental Association will be held in Cleveland, June 1, 2 and 3, 1916.

Clarence D. Peck, *Secy.*,
Sandusky, Ohio.

Connecticut State Dental Association

The Fifty-second Annual Convention of the Connecticut State Dental Association will be held at the Hotel Griswold, New London, Conn., June 13, 14, 15, 1916.

Papers and clinics of unusual interest have been secured, which with the excellent accommodations offered by The Griswold, will make this the most attractive meeting in the history of this association.

Elwyn R. Byrant, *Secretary*,
New Haven, Conn.

Odontological Society of Western Pennsylvania

The thirty-fifth annual meeting of the Odontological Society of Western Pennsylvania will be held at the Monongahela House, Pittsburgh, Pa., Tuesday and Wednesday, April 11th and 12th, 1916.

The first regular session of the society will open on Tuesday at 10 A.M.

The Executive Council will meet at the Hotel at 9:30 A. M. for the transaction of business in the interest of the society.

The clinics and exhibits will be at the Monongahela House. Exhibitors are cordially invited to visit this meeting, and requested to make early reservation for space.

A cordial invitation is extended to all ethical dentists in Pennsylvania and adjoining states.

King S. Perry, *Secretary*,
719 Jenkins Bldg., Pittsburgh, Pa.

Michigan State Board of Dental Examiners

The next regular meeting of the Michigan State Board of Dental Examiners for the examination of applicants who may desire to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, June 19, 1916, at 8 o'clock A. M., and will continue through Saturday, June 24th.

For application blanks and all further information application should be made to

E. O. GILLESPIE, *Secy-Treas.*
Stephenson, Mich.

Lake Erie Dental Association

The fifty-third annual meeting of the Lake Erie Dental Association will be held at Hotel Bartlett, Cambridge Springs, Pa., May 18, 19, 20, 1916.

Respectfully,
J. F. SMITH, *Secretary,*
120 W. 18th St., Erie, Pa.

The following prices will be effective in our laboratory, starting April 1st, 1916

VULCANITE WORK

Vulcanite Plates, complete (teeth extra)	$2.25	
Extra Tryins	.25	
Plates, ready for flasking	1.75	
Plain Clasps	1.00	and up
Gilmore Attachments (soldering only), each	.75	
Vulcanite Plates repaired	.75	and up

ANATOMICAL PLATE, 1 x 14

Articulating only $1.50

RICHMOND CROWNS

Anterior (band and pin extra)	$2.50
Bicuspid (band and pin extra)	$3.25

GOLD CROWNS

Incisors and Cuspids	$1.75	and up
Bicuspids	2.00	"
Molars	2.50	"

BRIDGE WORK

Incisors and Cuspids	$2.00
Bicuspids	2.50
Molars	3.00

Steele's Facings and Posteriors, same as above

P. A. Backings furnished Gold Backings, 50c extra

The Ransom & Randolph Company
TOLEDO, O. U. S. A.
CLEVELAND COLUMBUS GRAND RAPIDS

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

Thomas Lewis Gilmer, M.D., D.D.S., Sc.D., has been chosen to succeed the late Dr. Greene Vardiman Black as Dean of the faculty of the Northwestern University Dental School. Dr. Gilmer has held the chair of oral surgery in the Northwestern for more than twenty years.

Dr. Loomis P. Haskell, veteran printer and dentist, has finally, at ninety, been obliged to retire on account of failing sight. He says that his health is perfect, eats and sleeps well, and enjoys life as well as ever. An article from his pen appears in this number.

Reported that Prof. F. A. Fahrenwald, of Case School of Applied Sciences, has discovered a substitute for platinum in a combination of tungsten and molybdenum, treated in a gold bath, making the new alloy superior to platinum for dental purposes in some particulars.

Don't overlook Dr. Jules J. Sarrazin's masterful article on "The Emetine Error" in which he more than hints that the poor old Ameba buccalis only revels in conditions that it has been blamed with producing. Emetine may kill the guests, but we must search further for the landlord.

The movement for free clinic at Lafayette, Ind., has succeeded, as predicted. A free dental department has been opened in the vocational building, with a complete equipment, paid for out of public funds, as it should be.

Dr. A. J. Bush has resigned his position as professor of Crown-and-Bridge Work and Orthodontia at Dental department. O. S. U., and Dr. Earl G. Jones has been given the chair of Orthodontia in his place. Both are residents of Columbus.

Dr. G. B. Speer, formerly of Ohio, but now practicing at Los Angeles, has been appointed oral surgeon on the staff of the Children's Hospital in the latter city.

Children should be examined early with reference to position and condition of third molar. Dr. Edward C. Kirk, editor of *Cosmos*, says that impacted thirds have been responsible for epilepsy St. Vitus dance, nervous breakdown; retarded mental and physical development, and even imbecility.

The extent of the world's debt to dentistry will not be realized for perhaps another century, and by that time ninety per cent. of medicine and surgery will be dentistry and the rest quinin. Just now dentists are setting the world a pattern in facial restoration, reduction of fractures in and about the mouth and other intricate operations such as orthodox surgery believed to be impossible.

Madison, Wis., finally has opened its first free clinic. Took several years of hard work to bring about a result that ought to have been accomplished years ago. Dentists of the city have volunteered free services.

Clinic at Rock Island, Ill., three weeks old, already reported a pronounced success. Soon they'll be wondering how they ever got along without it.

There is work ahead for the brethren down in Tennessee. Recent examination in Bradley county shows that one-third of deciduous teeth and one-fourth of permanent teeth in school children are decayed beyond salvation, and that less than ten percent. of the children ever have used a toothbrush.

The San Antonio, Texas, association is inspecting schools free of charge.

Fresno, Cala., now agitating for free clinic.

Atlanta, Ga., is likely to establish free clinics.

More news from Tennessee. In Humphries county only seventeen sets of perfect teeth were found in 700 mouths examined.

Wheeling, W. Va., reports thirty children treated during the first full day's operation of free clinic.

St. Paul, Minn., is getting in line for free clinic, but the members of the dental society must donate equipment, besides doing the work free. It sometimes seems that enough is too much of that sort of thing.

Ottawa, Ill., wants dental and medical inspection.

San Francisco has established a dental interne at San Francisco Hospital for treatment of destitute children.

In one Fargo, N. D., school room, but three of thirty-four pupils ever had cleaned their teeth when asked by the teacher a few days ago.

Milford, Mass., says it is too poor to inspect the teeth of its school children. Another case for charitable dentists later on.

Dentists of Quincy, Ill., offer free service if clinic is established.

DeKalb, Ill., is getting in line.

Dr. J. H. Hanning, of King's Park Hospital, Brooklyn, says that many supposedly incurably insane patients make complete recovery upon having mouth and tooth-troubles remedied.

The Rotary Club, of Utica, N. Y., is booming the project to establish free dental clinic, proposing to contribute $2,000 for its equipment, provided there is some assurance that the city will take care of it after it is opened.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVI MAY, 1916 No. 4

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REGULAR CONTRIBUTIONS

INSTRUMENTATION IN ROOT CANAL PREPARATION*

BY R. SIEGEL, D.D.S., CINCINNATI, OHIO

THE PARAMOUNT ISSUE before the dental profession today, more so than at any other time in the history of dentistry, is the treatment and proper filling of infected and noninfected root canals.

It is paramount because we know of the numerous evil results emanating from improperly treated and partially filled root canals. These disastrous results are not localized in the teeth and jaws, but throughout the general system. The preparation of root canals is one of the important and most difficult mechanical problems in the field of preventable dental diseases.

We must stop and reflect with amazement at the multitude of afflictions due to the lack of knowledge in this particular line of treatment. It will be through instrumentation that the treatment of root canals will be brought to a successful termination. Let us consider the various methods in use at the present time, beginning with the dental burs, drills, reamers, spiral broaches, barbed and smooth broaches of various sizes, electric root dryers, hot air blasts, absorbent paper points, etc. Let us eliminate all undesirable instruments and methods.

---

*Descriptive clinic given at Ohio State Dental Society, Columbus, December, 1915.

First: Drills and reamers never should be used in preparing root canals. Judging from the many perforated and partially opened root canals, I consider their use extremely dangerous. Is it not a common occurrence in drilling or reaming for the purpose of enlarging the canal, that the instrument either breaks or perforates the walls or apex of the root, creating an irreparable injury? Should there exist, as frequently does, a curvature of the root, the smallest drill will not follow the natural canal, but will create an offset or false channel, after which it will be impossible to treat such a canal successfully. This I will demonstrate with the illustrations.

Second: The electric root canal dryers have no place in the preparation of root canals for filling. They are all too large for the average root canal; they cannot be used in the smaller root at all, and there is danger of overheating.

Third: The method of drying root canals with hot air blasts, aside from drying the pulp chamber, is of no value. Physically, it is impossible.

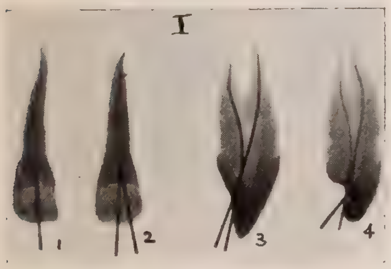
Fourth: Paper points are in the same class with the hot air; they do not go far enough. The method of enlarging root canals to suit the much-too-large instrument in use, is wrong. I prefer to make the instrument to suit the root canals eliminating all the above-mentioned dangers.

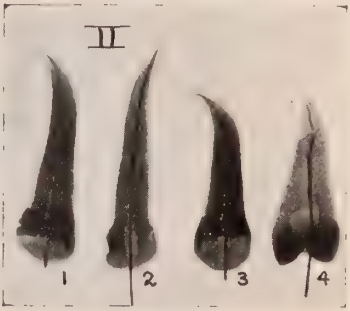
In the successful treatment of root preparations, let us not forget the all-important rule of aseptic precautions. Let us also remember that we can not work around a corner. Easy access to all canals is very essential. The selection of an improper broach is often the first cause for the inadequacy of the instrumentation. After the barbed broach, size fine, and double fine, has opened and removed all organic tissue or debris present, a smooth, round and tapered broach is the only one that should be used.

I wish to emphasize the round broach, because the round tapered broach is by far more rigid than a partially flattened one. If the opening into the canal is too small to permit of easy ingress, apply a wisp of cotton saturated with a fifty per cent. solution of sulphuric acid and follow, of course, with bicarbonate of soda, and then a double fine (Kerr) spiral broach. This usually gives us an opening large enough to treat without injury. A smooth, rather than a barbed broach should be used, for the reason that it can be made much thinner or finer than a barbed broach possibly can be. The round, smooth broach can be wrapped more uniformly than a flattened one.

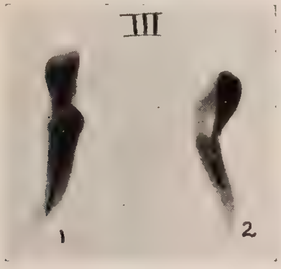
Many find fault with a smooth broach because of the difficulty which they claim is encountered in wrapping it with cotton. This is an error of judgment and a lack of practice upon their part. It is not so difficult to wrap a smooth broach; it only requires a little practice. This can even be done mechanically perfectly with the aid of the machine described at the end of this paper.

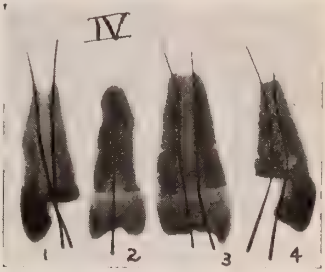
I wish to state that there are many abnormal roots which can not be filled, but there is a greater percentage of normal roots which can be filled successfully and are not filled. It is concerning these normal conditions that I wish to interest you. If I succeed by these illustrations to stimulate an active interest in rational root preparation, I shall feel amply repaid.



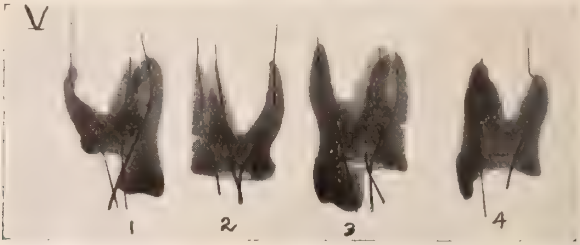


In Fig. 1 two lateral incisors, right and left, are shown. The first tooth shows a slight curvature at upper third of the root. How easy it is to prepare such a root canal for filling without the aid of a reamer or drill! The smooth broach follows the curved root canal to the apex and beyond, if necessary. You can see how simple it is to thoroughly medicate and dry this root canal for a perfect filling with this smooth broach properly prepared. The second tooth is of the same shape. Instead of using the small smooth broach, I employed the finest Beutelrock drill. The drill perforated the root before reaching the apex. This root should have been prepared in the same manner as the first, using the smooth broach. The next two teeth show the lateral view of two upper cuspids with two separate root canals and two separate foramina. Had the picture been taken from labial to lingual, the root canals would have been superimposed and would have shown only one root canal on the film. It is very important to bear this in mind when sealing the apical foramina.

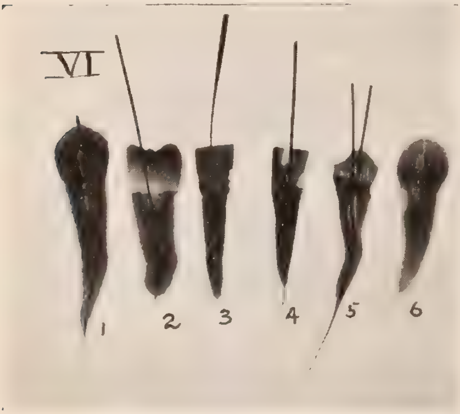


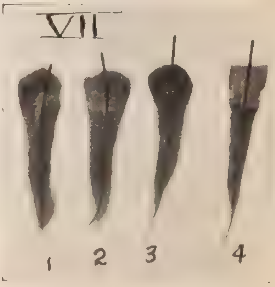


In Fig. 2 we have three cuspids with curved roots. The first shows the smooth broach following the natural canal without injuring it. The second tooth shows the result of a drill, the long broach showing the course of the drill, the small end of a broach showing the natural apical foramina. The third tooth shows how impossible it is to injure this root with the smooth broach. The fourth tooth is a bicuspid with a broken broach. How impossible it would be to follow that canal with a drill. You see how the drill is beginning to create its own course through the side of the tooth instead of following the broken broach.



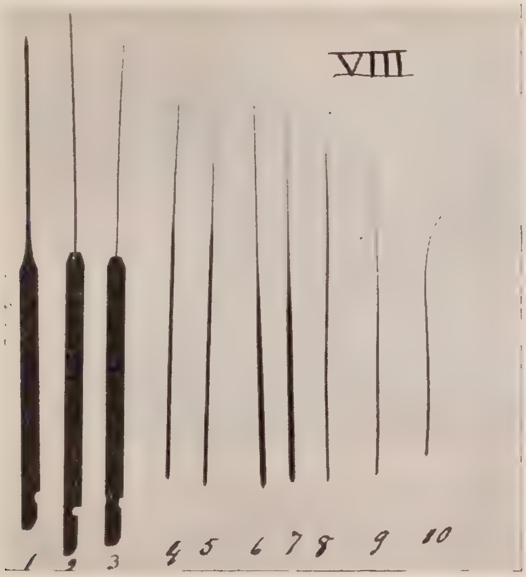
The Gates-Glidden drill should not be used under any circumstances. I am glad to state it is fast going out of use. In the first tooth, in Fig. 3, see how the drill has created a false canal. Although the drill has not perforated the side, it would be impossible now to follow the natural canal with any other kind of an instrument. The second tooth is another example of the first except that the drill broke. Both of these teeth might have been prepared and treated successfully with the proper instruments.





In Fig. 4 the first tooth is a first upper bicuspid with the almost unvarying two separate and distinct foramina. It is very common to find this tooth abscessed because one or the other root canal has been overlooked. The second tooth, a second bicuspid, has a marked exostosis. This tooth can be treated successfully as the small instrument will show. The other two teeth also show two separate root canals.

In Fig. 5 four upper molars are shown. The first one has a decided curvature in the lingual root. How necessary it is to use smaller instruments. Had I resorted to a reamer or drill in this case, a perforation would have been unavoidable. Notice that one of the buccal roots is comparatively straight and yet there is a pronounced curvature in the root canal. The next two show two normal teeth which are very easy of access for treatment and root filling. Notice the curvature in the root canal in the straight root of the fourth tooth, the broach turning almost at right angles at the end. The drill or reamer could not follow this curvature. This again will prove my contention that *it is better to make the instrument small enough to follow the root canal, rather than enlarge the root canal to suit the instrument.*

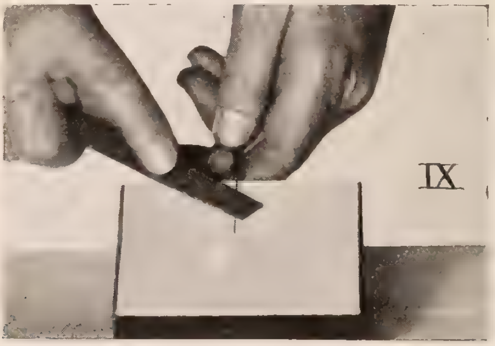


In Fig. 6 the first tooth is a lower cuspid with a curved and very small root canal. Ordinarily this would be considered an easy tooth to treat, but judging from the many skiagraphs such a root is often only partially filled. The second tooth is an exostosed lower bicuspid with a very fine canal. How far could this root canal have been dried with an electric root canal dryer or a paper point? The third tooth is a lower central incisor, with the finest broach from the supply house inserted in the root canal. With difficulty it was possible to insert it as far as the skiagraph shows, but it is still far enough from the apex to make proper preparation an impossibility. Also observe the shape of the instrument; it is not tapered uniformly; it has no rigidity. Notice the next hand-made instrument in the fourth tooth.

It has more body and will not break so easily as the first broach. The fifth tooth is a labial view of the first tooth in Fig. 4. Here we have a curvature, while in the former the root appears straight. The sixth tooth is a lower cuspid with a very fine root canal and the apical foramina slightly to the side.

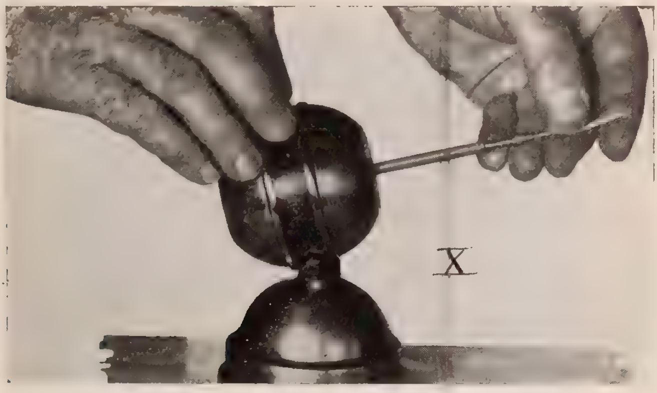
Fig. 7. This is a very interesting picture, the first tooth having extreme exostosis. The second has the apical foramen to the side. The third and fourth have very fine tapered ends. With or without the aid of the X-ray in the mouth, would you be justified in using a reamer or drill in order to thoroughly treat or dry any of these roots?

We see in the group of instruments shown in Fig. 8 some of the popular root canal instruments. The first is the smallest of the Gates-Glidden drills. As we have seen in the various slides, it is a very dangerous instrument. So far, I have not found a place for it in the treatment of root canals. The next two are the fine and extra fine Beutelrock drills. In a curved root they are equally as bad as the Gates-Glidden drills. You will agree with me that after using a drill in the root canal for any distance, that any farther treatment of the remaining canal is greatly interfered with, and in most instances what remains of the canal can not be found at all. The fourth and fifth instruments shown are better suited for this work, especially the fifth one. This is the finest (Kerr) spiral broach. This broach will follow most of the difficult curved canals, but I do not advise following the broach with the next large size, which frequently clogs or stops up the path of the first one. The manufacturers in the last few years have given us a very fine barbed broach, and only recently a XXX barbed broach, which will easily follow the path of the finest Kerr spiral broach, has been put upon the market. The last three instruments are hand-made broaches which can be made fine enough to follow the most tortuous canal. After the pulp has been removed with the finest barbed broaches, the fine smooth broaches will be found ideal to carry medicaments into the canal, or after proper wrapping with cotton, to dry the canal to the very apex.



The method of making the small smooth broaches is shown in Fig. 9. The wire used is 26 gauge (Brown & Sharp) music wire. Insert the wire into a broach handle, file the wire as indicated in the picture with a medium coarse file, revolving the wire on the block while filing, in order to have it uniformly round and tapered. The size or style of the broach can be made to suit different cases. Finish with 00 emery paper with the same motion.

I consider the proper wrapping of the smooth broach with cotton the most important step in root canal work. It is impossible to wrap a smooth broach with the finger to prevent the cotton slipping back from the extreme end when used in a constricted root canal. The most satisfactory method is to use an instrument similar to the one shown in Fig. 10 to wrap the broach. This instrument is a small motor with a tapered shaft. The broach handle containing the hand-made broach is mounted on the cone shaped shaft of the motor. A wisp of cotton is held against the broach and the contact button on the top of the motor is pressed. This will revolve the broach so rapidly that the cotton is wrapped uniformly and tightly upon the broach so that *the cotton will go as far as the broach will go* in the finest canals. This is a strategic point in root canal treatment and filling. It is impossible to fill a wet or moist root canal. A number of broaches can be rolled at a time, sterilized and kept ready for a future operation.



The price of success in root canal work is careful attention to the smallest details. I hope I have succeeded in emphasizing some of the important points in this work and in helping to overcome some of the difficulties.

22 W. Seventh St.

A CORRECTION

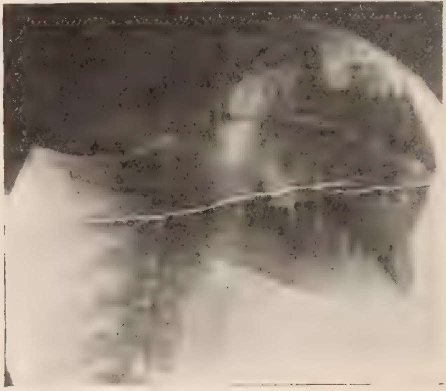
In Dr. Haskell's article in April number, the word "impression," sixth line from top of page should read, "frænum".

MANAGEMENT OF DIFFICULT EXTRACTIONS*

BY WM. C. TETER, A.M., D.D.S., CLEVELAND, OHIO.

IN PRESENTING THE SUBJECT of difficult extractions, I shall not attempt to enter into the discussion very extensively, since this is to be a short presentation of a long subject. I shall endeavor to present clearly only a few cases.

Broadly speaking there are two classes of difficult extractions. One including teeth easily recognized as difficult by their position in the arches, and relative relation to the other teeth. The other class including teeth not recognizable as difficult without careful diagnosis.



Slide 1

We might add a third class including those teeth made difficult or more difficult by hasty or careless operating, or failure to recognize the severity of the case before attempting the extraction.

I shall first present slides showing impacted lower third molars.

The lower third presents impacted, unerupted and crowded more often than any other teeth. There are different degrees of impaction, the teeth lying in the mandible at different angles. All impacted teeth are not unerupted, all unerupted teeth are not impacted. The great majority of impacted third molars lie at an angle of about 45 degrees, some at right angles and others stand perpendicular.

The first, slide (1) presents am impacted lower third molar lying at an angle of nearly 90 degrees. The technic for removing is as follows: Lance the gum from a point below the center of the buccal surface of the crown of the second molar backward, extending well up the ramus of the jaw. Then with peristyle strippers push back the tissues baring the bone freely. For removing the process I use a large inverted cone bur. There are any number of bone burs and round burs, but in my practice I have preferred an inverted cone bur of large size. Start to cut on the ramus of the jaw distally to the tooth, cut down well distally and bring the bur buccally, keeping it against the tooth cut mesially a sufficient distance to create enough space to allow the insertion of an elevator under the mesio-buccal cusp of molar. After this cutting, by use of elevators, the tooth is elevated up and back into the space cut, and if sufficient process is removed, the elevation ordinarily is not difficult. The amount of removal of process distally depends upon the distance the tooth has to be moved backward in order to clear the distal contour of the second molar.

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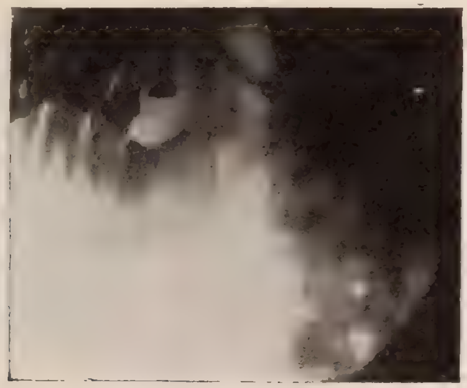
*Read before the Ohio State Dental Society, Columbus, Dec. 1915.

Slide number two (2) presents an impacted unerupted lower third molar standing perpendicularly, which is generally more difficult to remove than one lying at an angle.



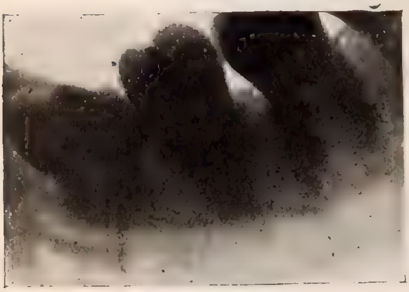
Slide 2

The difficulty in removal is governed largely by three principle elements, i. e. the angle at which the tooth lies, the shape and size of the roots and the density of the bone. With a tooth lying at an angle, when you cut distally and buccally, you have created space into which you can push the tooth crown allowing the roots to swing mesially into the space formerly occupied by the crown.

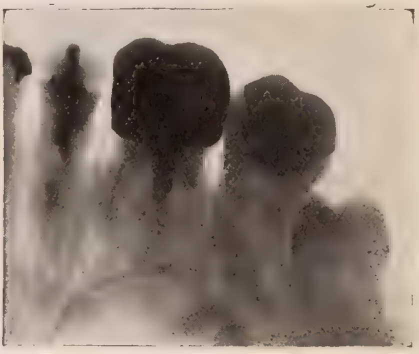
In perpendicular impactions when you have cut process distally and buccally, and inserted the elevator, the crown can be forced back only so far, and the apical ends of the roots will not move any appreciable amount, there being no space into which they can move. After I have tested the tooth with the elevator and it does not swing around, I know it stands perpendicular, even without an X-ray. In this case the cutting of process in the buccal aspect is continued well down along the root of the tooth fully half or two-thirds of its length. Then if the roots are bifurcated I insert an elevator in the bifuraction and raise straight up, otherwise I use long beak forceps, having bared the tooth sufficiently so that I am able to obtain a good hold, and by careful manipulation it can be raised out.

Slide three (3) presents an impacted lower third molar lying entirely beneath the process. It is necessary to remove all process above the tooth also on the buccal aspect down sufficiently far, that an elevator may be inserted beneath the tooth rolling it out buccally.

Slide four (4) presents an impacted unerupted superior third molar. As a rule these teeth are not so difficult to remove as impactions in the mandible. An incision is made in the gum tissue from the distal aspect of the second molar back over the tuberosity, gum and periosteum stripped back well, both on buccal and palatal surfaces, with a bone forcep it is comparatively easy to remove the surrounding process. This process is not nearly so dense as on the lower jaw. When the tooth is bared, it can be gotten hold of with a long beaked alveolar forcep and by rational manipulation generally is removed without much difficulty. I have had some cases, however, where the roots were very large and crooked or badly exostosed, when I had to do considerable drilling with large bur in order to free the roots.



Slide 3



Slide 4

Slide number five (5) presents an impacted unerupted superior cuspid. These teeth are difficult primarily because they are hard of access, with all the other teeth in place. You generally find the incisal edge of the cuspid in the region of the apical ends of the roots of the lateral and central incisors, with the apical end of the cuspid root extending backward at different angles in the maxilla. The gum is incised about one-eighth of an inch above the gingival margin and stripped back well baring the palatal wall. Then with burs the process is removed baring the tooth until it can be dislodged.

I will now speak of some of the difficulties included in the third class previously outlined. One kind is in the region of the bicuspids lower, where probably the deciduous teeth have been extracted too soon, and there is no room for the teeth to erupt normally and they come in pointing lingually. In those cases, nine times out of ten if removal is attempted with the forceps and much stress is used, the tooth breaks off even with the process. The rational method is to dissect the tissue away, and either with a chisel or a bur, remove the process on the lingual side, then with the elevator the tooth may be forced out through the opening cut in the lingual process. If there should be room between the bicuspids, not for forceps to go through, but right at the gingival margin, to lance the gum and dissect it away, a bur can be inserted against the tooth and cut straight down and remove the process from the buccal side. I prefer to cut the process on that side, and on the lingual process as little as possible. I have found some of the most difficult cases in bicuspids, the first or second, that have been broken off flush with the alveolar process. When a crown is broken off, you must try to recognize why it was broken. If it was brittle, you may have exostosis of the root, and if you got another hold, you probably would break it off again. I always dissect the gum away and use the chisel or bur, and take away the process on the buccal side. Then I may be able to get a forcep hold. It is hard to elevate, if the teeth on either side are sound and perfect. but when you cut down so that you get your forceps onto the root, it can be gotten out generally quite easily. Yet I have had some so obstinate, that instead of cutting the process away, I have used cone shaped burs, and drilled the root out to the bottom of the socket, which obviates the dissection of any tissue. You may have difficulty in extracting a second molar more often than the first, where the third and first molars are perfectly sound, especially if the second molar has been devitalized; the crown breaks off easily. I resort to chiseling the process away on the buccal side, enabling me to get into the bifurcation of the root, and elevating it from the side; or sometimes take a bur and drill right through the pulp chamber, through to the bifurcation of the root, and then I can get an elevator in and raise the roots out very easily. If the root is of the class that does not bifurcate, after I have cut the buccal process away and the tooth does not respond readily to the elevator, I use a long beaked forcep.

Slide 5

In regard to forceps, I use heavy handles, and alveolar beak forceps for all extractions. In my experience the average molar forcep is good for nothing except to extracate a tooth that should not be extracted. With the alveolar forceps, if a tooth breaks, I have a root forceps in my hand; I do not have to change forceps.

A very important phase in handling difficult extractions, is to be able to have the patient anesthetized, either generally or locally. Of course, I prefer the general. No man can extract teeth as it should be done in a hurry, any more than he could prepare a difficult cavity for an inlay in a hurry, and the day of tooth snatching should be over. The extracating of teeth, I believe, is the most surgical part of dentistry, and really is in the field of surgery, because no matter how easily a tooth looks to be extracated you may have difficulty in removing that tooth, and any man who hasn't his patient in a position where he can do that painlessly and without annoyance to his patient, will bungle. Therefore, the first requirement for a man to do difficult extracation is to be able to induce and maintain perfect anesthesia. If I could not do that myself, I would not attempt extracation without having an anesthetist to do it for me. The great majority of dentists are poor anesthetists, also poor extractors. I believe altogether too little attention is given in our college curriculum to these very important subjects, and that instead of our graduates leaving school well qualified in these important fields, they are under the painful necessity of acquiring knowledge at the expense of their patients. The majority of dentists dread anesthetics, also extractions and recognize that both are truly special fields. However, all dentists cannot send their patients to specialists, therefore, they should be afforded better opportunity to prepare themselves for the work they are obliged to do. At least they should be instructed sufficiently to recognize difficult cases, thereby avoiding much trouble both to self and patients.

I trust that my feeble effort may have brought to you some thought that may prove helpful. I assure you I have appreciated your thoughtful attention and I thank you.

Rose Bld'g.

A CAST BASE FOR A PORCELAIN CROWN*

BY G. D. EDGAR, D.D.S., DEFIANCE, OHIO

Prepare the root by cutting off at the gingival line and grind the labial surface quite short, and on the lingual surface make a groove with a "fissure bur" at the median line.

Prepare the crown by taking a knife-edged wheel and cutting a "V" on the lingual side; then insert post in the root and apply the warm inlay wax, pressing crown to place, trim away excess wax with spatula and apply the sprue wire at the lingual side where the groove on the root and the "V" in the crown meet, remove and cast.

When inserting the post in root, give it a rotary movement until you feel it drop into the groove, and the same with the crown.

The object of this is that you know to a certainty that your base is on the root and crown in the identical position of impression without great loss of tooth tissue.

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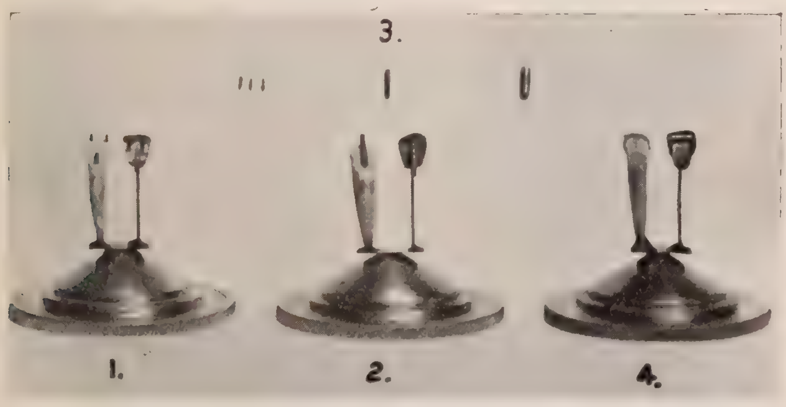
*Clinic Ohio State Dental Society 1915.

SPLINTS FOR PYORRHETIC TEETH*

BY GEORGE S. HERSHEY, D.D.S., COLUMBUS, OHIO

THIS IS TOO BIG A SUBJECT to cover in a paper limited to fifteen minutes, as there are about as many kinds of dental splints as there are bridges.

To be brief, I will consider only the splints which in my judgment I believe to be practical and permanent in the mouth.



All of us interested in pyorrhea no doubt know when and where to use a permanent splint, but many times we lack judgment in the selection of our attachments which enter into the construction of the splint.

The points to be considered are these: strength, preservation of the interdental space, exposure of as little gold anteriorly as possible without sacrificing rigidity. All this must be done without devitalizing the healthy pulp.

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*Descriptive clinic at Ohio State Dental Society, Columbus, December, 1915.

We are all familiar with the dowel or one pin attachment, and therefore I will compare, in strength, the others with this one.

I am indebted to Prof. William S. Hindman, of the Civil Engineering Department, Ohio State University, for the following conclusions, which of course have been scientifically worked out. Not only those interested in splints, but those interested in attachments for bridges will find these conclusions very educational. The figures in the calculations run into the millionth part of an inch, and it would not mean much to us to quote them. Therefore I will explain my points by comparison only, aided by the pictures shown on the screen.

For anterior splints I will consider only the dowel and plate, the three-pin, and the Carmicheal attachments.

In the three-pin and plate attachment, (Fig. No. 1) the pins are of 22 gauge, gold-coated, tungsten wire, one tenth of an inch in length. The frictional resistance offered by the combined surfaces of these three pins is equal to the frictional resistance of a tungsten wire two-tenths of an inch long, gauge No. 18, as shown in the dowel and plate, Fig. No. 2.

In comparing these two attachments, the surfaces of the plates were not considered, as one offsets the other.

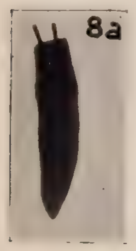
Tungsten has about seven times greater bending strength than iridio-platinum. This comparison is shown in Fig. No. 3.

The three tungsten pins one-tenth of an inch long have frictional resistance equal to the tungsten wire (middle one) two-tenths of an inch long, gauge No. 18. This gauge tungsten is equal in bending strength to an iridio-platinum wire measuring .076 of an inch, or between twelve and thirteen gauge, B and S. This comparison is shown by the large wire on the right. These comparisons are exact, and show the great strength of tungsten wire.

Figure No. 4 shows the Carmicheal attachment, which has about one-half the frictional resistance of the three pin attachment.

No. 5 shows the lingual view of lower anterior splint. The soldering of the attachments is done at the contact points.

This splint does not interfere with the interdental space, the preservation of which is very essential to the cleaning of the teeth, which is absolutely necessary to insure healthy gum tissue.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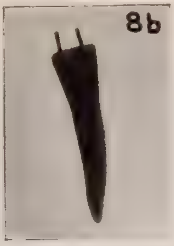
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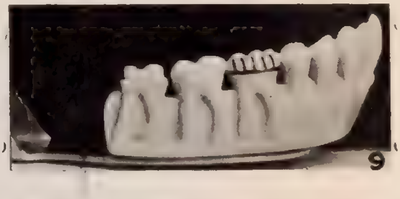
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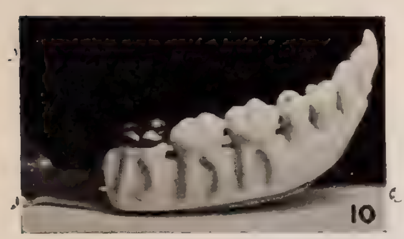
I would like to state here that, although I have shown three teeth joined with a splint, I do not believe that it is good practice to connect less than the six anterior teeth, if in the mandible. One to four incisors must necessarily be loose to indicate a splint, and must have the supporting strength of the cuspids to insure a long and useful life. There are few exceptions to this rule.

The next picture, No. 6, shows the anterior view. The gold should extend on the incisal edge about .030 of an inch, and if there is any cause to believe that there will be much stress, I would advise tipping this edge with a very small tungsten wire, this wire, of course, to be covered with gold in casting. These teeth were not selected with the view of assembling.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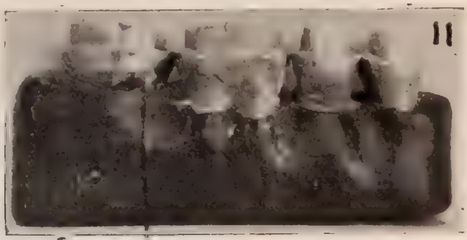
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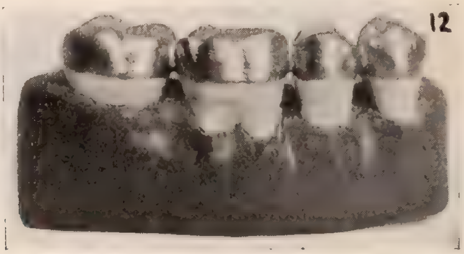
To be safe, it is wise to have a radiograph of the teeth to be operated upon. This will aid in many ways. It may help us to determine what particular attachment to use, by showing how far the pulp has receded, and if there are any blind abscesses, etc. The former condition is often very marked in loose pyorrhetic teeth.

Dr. Bowen, of this city, has kindly furnished me with the two radiographs shown in Figures No. 7 and 8. No. 7 is a picture of the lower anterior. The light lines radiating from the center of the teeth we believe to be caused by checks in the dried specimen. No. 8 shows a radiograph of an incisor in which are seen the three pins in relation with the pulp.

In my experience, I have never seen an occurrence of decay around these attachments, where they were well made and rigid. All things considered, I believe the three pin and plate attachment to be the most practical and permanent for the anterior teeth where the pulp is vital. If not vital, the dowel and plate attachment should be used.

As my time is getting short, I will just touch upon the subject of splints for posterior teeth, and show you a few views bearing upon this part of my subject.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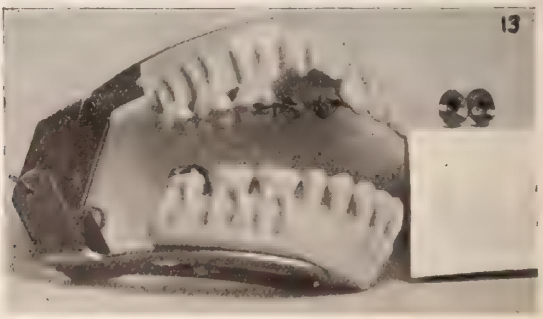
The shoulder crown is the attachment I advise, and the technic for this crown was fully explained in the January issue of the SUMMARY.

The next picture (Fig. No. 9) shows the preparation for the shoulder crown. The next one (Fig. No. 10) shows the finished crown. The next (Fig. No. 11) the teeth prepared for splint. Next, (Fig. No. 12) the splint, as it appears when set.

The advantages of this splint are conservation of the vital pulp, preservation of the normal interdental space, equalization of stress on all teeth included in splint, and probably the most important, the elimination of the line or irritation so pronounced in many attachments.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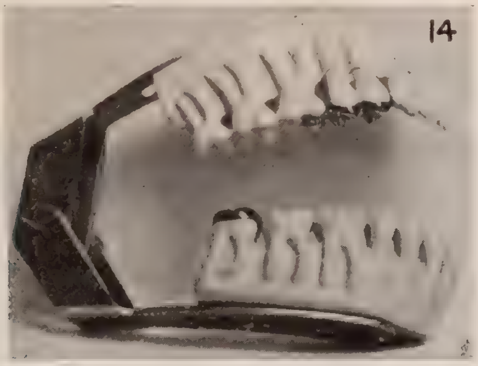
Before closing, I would like to deviate from the subject of this paper for just a few minutes, to put before you for your consideration an idea, the principle of which I think is new and original.

Dentistry, now and in the future, must be carried out with the thought of cleanliness, and no restoration should be resorted to that cannot be thoroughly cleansed by the dentist and likewise the patient.

You probably all know that no fixed bridge is as easily kept clean as the one we call the sanitary bridge, if it is well made and placed where indicated. This bridge has never been indicated anteriorly because of its unsightliness. To overcome this difficulty I have worked out the following idea which I will endeavor to describe to you:

In the picture (No. 13) you will see a sanitary bridge, spanned from the cuspid to the first molar. It cannot be denied that all surfaces of this bridge are exposed and can be easily cleansed and polished. But it is contra-indicated on account of its unsightliness. To overcome this, I have made removable dummies, which can be placed in position by the patient as well as the dentist. The picture of the dummies, or artificial teeth, are seen on the right.



Embedded in the center of what we will have to call the occlusal surface of the dummy is a clasp. In the span between the two abutments of the bridge you see two balls, which engage in the clasps set in the dummies, when they are in place. In other words, as the manufacturer of these clasps expresses it, you "button them in."

The last picture (No. 14) shows the dummies in place.

These dummies, no doubt, can be made by any method now employed, once the balls and clasps have been placed in position on the span.

This is just an idea I have worked out and finished on this model a few days ago. So I have not as yet put this to a practical test, but I am offering it to the profession as a new principle in bridgework, which may lead up to some greater work in this direction.

Hartman Bld'g.

A NEGLECTED DENTAL PROSTHESIS*

BY ALDEN J. BUSH, COLUMBUS, OHIO.

THAT DENTAL PHOSTHESIS HAS BEEN NEGLECTED in the past because of lax methods of practice, and because of antiquated equipment, and that our service has been rendered inefficient through our failures to master the principles and requirements of even such methods and facilities as we have had, has, no doubt, contributed to our heritage of a neglected dental prosthesis. But modern dental science has done much to relieve us of the difficulties encountered in the past, and it now seems at the present time that no valid excuses may be offered in defense of those of us who encounter failures.

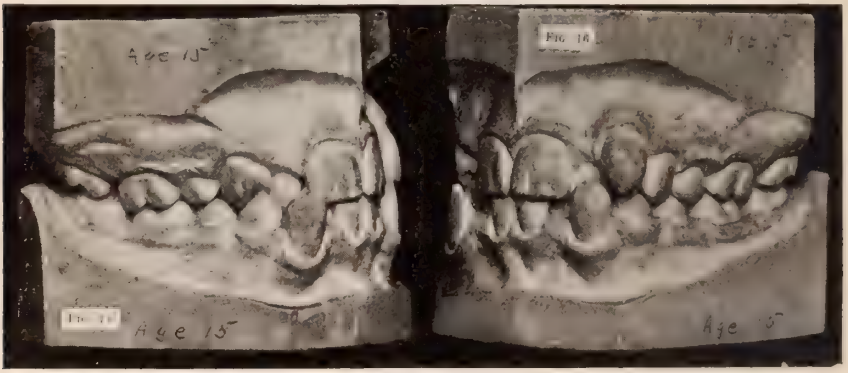


Fig. 1

Dental prosthesis is most decidedly a mechanical art and it is not at all remarkable, therefore, that strong personal likes and dislikes should find expression in successful operations or scientific achievements, and that failures or indifferent results should greet the efforts of those of us whose natural gifts and inclinations would find a more compatible and profitable vocation in other fields of endeavor.

In my opinion there are four items which have in the past and are now contributing to our failures and which may also be considered the reasons for the neglect of dental prosthesis by the majority of the profession.

First: Imperfect impressions and models.

Second: Failures to comprehend the significance of correct occlusion and articulation, and a corresponding indifference to the use of articulator methods which meet the requirements demanded of scientific occlusion and articulation.

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*Presented at the Northern Ohio Dental Society, 1915.

Third: Improper tooth forms.

Fourth: Trying to do the impossible.

It certainly would be irrelevant to the intent of this paper to touch upon all these, but I trust you will pardon me if I give a brief discussion of the last item.

Dental science prescribes methods in detail for every procedure, including the selection and arrangement of tooth forms, and promises reasonable assurance of uniform success in what I will call *normal* cases. No scientific methods or plans have been offered for the scientific management of such cases as I shall call *abnormal*, except such plans as have been prescribed for the treatment of all cases in general, and therein is found the fourth reason for failures which are the most discouraging and certainly should be considered among the reasons for a neglected dental prosthesis.

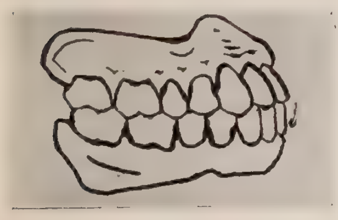

Fig. 2

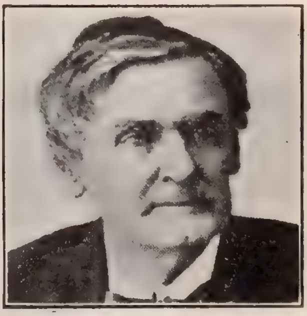

Fig. 3

Malocclusions of the teeth are found in all races and have become so common that it is now almost the rule rather than the exception.

Out of several thousand cases of malocclusions examined by Dr. Angle, the proportion per thousand belonging to each class was as follows: Class 1, 692; class 2, 266; class 3, 42.

Class 1. Fig. 1. (Angle) is characterized by normal mesio-distal relation of the jaws and dental arches. Individuals suffering from this type of malocclusion and who subsequently suffer the loss of their teeth should become ideal subjects for the dental prosthetist.

Fig. 2. In this class of cases it is unquestionably proper to place the first molars in normal mesio-distal relation to each other. In fact, all teeth may, and perhaps should be, placed in approximately normal relations and normal occlusion assimilated in so far as consistent with the facial peculiarities and especially of the lips, which characterize Class 1 cases. Likewise I consider it to be correct practice and in strict accordance with the principles of harmony as applied to the teeth and face, to make artificial dentures with teeth in normal occlusion in order to maintain the perfect balance of the face and jaws and especially of the lips which were molded over teeth in normal occlusion, *provided normal occlusion of the natural teeth actually existed prior to their loss.*

It would perhaps be very trying for the average practitioner to diagnose a case of malocclusion as having previously existed in an edentulous mouth. By referring to Fig. 3 (Angle) you will quickly recognize that this finely molded face, with its firm chin and mouth, were developed in harmony with a normal denture, and what a pleasant task it would be to construct artificial dentures for such a case, using the beautiful tooth forms that are now available and for which we are largely indebted to Dr. Williams and Prof. Gysi.

All edentulous Class 1 cases should be comparatively easy to recognize since the jaws are in normal mesio-distal relation and present comparatively few difficulties for solution in the making of full dentures, in so far as the arrangement of the teeth is concerned.

Class 2 cases are characterized by the lower arch being distal to normal in relation to upper arch and according to Dr. Angle about 25% of all cases of malocclusion fall within this class, and furthermore, according to the same authority, substantially 33% of this class fall within Division 1, Fig. 4, (Angle), which division is further characterized by protuding upper incisors and undeveloped lower jaw and chin.

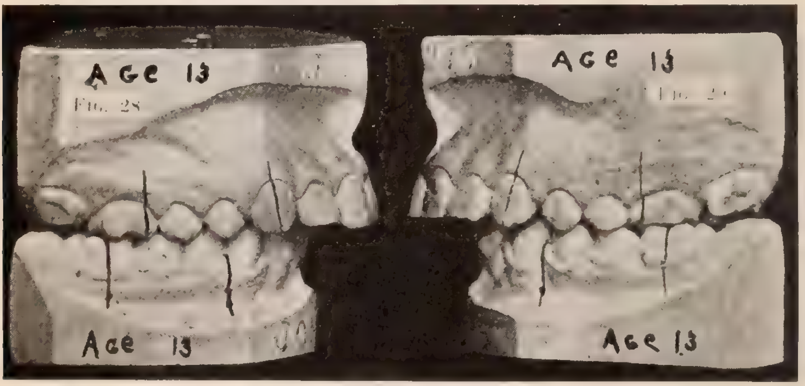

Fig. 4

In proportion as malocclusion exists the functions of the teeth and speech are impaired, and invariably the facial deformities are so constant and characteristic of the type of malocclusions with which they are associated that it becomes quite as easy to classify edentulous cases as dentulous.

What shall we do with these cases? If taken in time the orthodontist may correct the malocclusion, and nature will renew her efforts toward the development and growth of all the related parts, and in time establish full harmony of these parts according to nature's plan. But no; these cases, uninterfered with, are permitted to progress until late in life when the deformities of the face and jaws are permanently established and ultimately when the teeth are finally lost, call upon the dental prosthetist for artificial dentures.

The following quotation, taken from Dr. Clapp's book on Prosthetic Articulation, page 139, is an eloquent declaration of principle regarding this point in question:

"The articulation of the adult natural teeth probably determines the formation of the articulating surfaces in the condyles and fossae, the muscular action, and the habitual masticating movements of the jaw. The arrangement of the artificial teeth will determine whether the patient shall be enabled to continue these movements, which are the most efficient he will ever have, or whether these movements will be destroyed, with a strong probability that other efficient movements cannot be substituted."

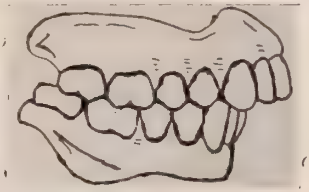

Fig. 5

Edentulous Division 1, Class 2, cases cannot therefore be treated as normal occlusion cases or even as Class 1 cases, for if the articulating surfaces in the condyles and fossae, the muscular action, and the habitual mastication movement of the jaw are determined by the articulation of the adult natural teeth, then so also must be the artificial teeth articulated in order to enable the patient to continue habitual masticating movements.

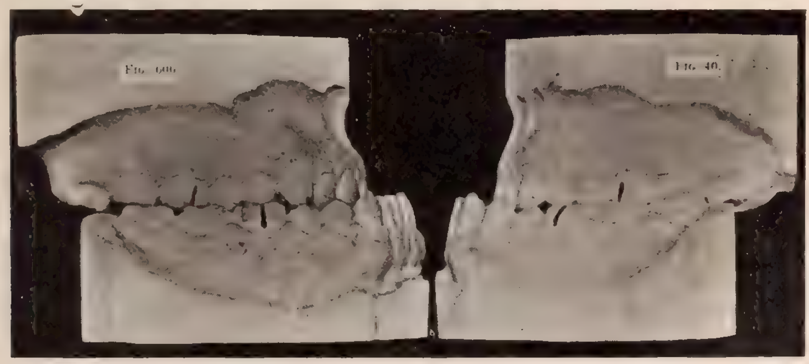

Fig. 6

This, then, controverts common practice in the management of Division 1, Class 2, edentulous cases and seems to indicate that in order to render maximum service in securing the greatest possible masticating power, the lower dental arch should be articulated distal to normal in its mesio-distal relation to the upper arch, as illustrated in Figure 5.

The same principles contravene common practice in supplying normally occluded dentures for Division 1, Class 3, cases, Fig. 6, (Angle), and accordingly it seems that the principle enunciated above can best be subserved by articulating dentures for this class of cases as illustrated in Figure 7.

It is not within the province of dental prosthesis to reclaim opportunities lost to orthodontia. In other words, the marvelous and almost incredible improvements wrought by orthodontia in perverting maldevelopment of the jaws and restoring distorted facial contours to lines of symmetry and beauty through operations performed upon the natural teeth, are opportunities lost to dental prosthesis.

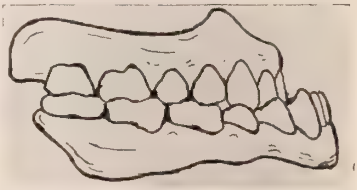

Fig. 7

It perhaps demands a higher order of skill to replace teeth missing from jaws in malrelation, which demand teeth in malocclusion, than to render a like service in case of well proportioned jaws in normal mesio-distal relation, but the former service is none the less a work of art and perhaps even the greater of the two, notwithstanding the fact that the latter, from the esthetic standpoint, may be the more pleasing.

289 E. State St.

SOME DENTAL USES FOR RICE FLOUR

BY C. H. WOOLGAR, M.D., D.D.S., MAGDALENA, NEW MEXICO

To make this preparation of rice flour, take impression plaster of Paris 4 parts; rice flour 1 part; each to be added by measure; mix thoroughly. Place the powder in a box and label it "Crown and Bridge Impression Plaster." When preparing to take impression add a little more salt to the water than you would to plaster of Paris impression, as the rice flour slightly retards the crystallization of the plaster. After taking the impression, stain and pour model for crown or bridge. When model is hard, place model and impression in boiling water, and the impression will gradually disintegrate into small flakes, leaving a perfect model, crowns and teeth intact. When the impression starts to disintegrate in the boiling water, a sharp pointed instrument may be used to remove the soft parts of the impression, thus hastening the separation of the impression from the model.

No injury to the model will take place in the hot water, if the model has had time to become thoroughly hard.

Rice flour is not affected by cold or luke-warm water. Hot water causes the rice granules to increase in size, disintegrating the plaster impression.

Rice flour is a good substitute for precipitated chalk for cleaning the teeth. It adheres to the engine brush much better than precipitated chalk and is not as abrasive. The addition of two or three drops of biflorid ammonium to the rice flour will be found an aid in cleaning tobacco stain from the teeth.

HISTOLOGICAL CONSIDERATION IN THE PREPARATION OF GINGIVAL WALLS*

BY W. C. STILLSON, D.D.S., CLEVELAND, OHIO

IT WOULD BE QUITE IMPOSSIBLE for me to touch upon many phases of cavity preparation in the time allotted for this clinic, and I have chosen the subject of the preparation of gingival walls because this is the one location where failures so often occur. But before discussing the subject proper, it might be well to review in a general way a few things which must be constantly borne in mind in all cavity preparation.

DIRECTION OF THE ENAMEL RODS

Aside from extension for prevention, perhaps nothing has contributed so largely toward placing cavity preparation upon a truly scientific basis, as the realization of the importance of the direction of the enamel rods. We have come to know that in the preparation of cavities, the direction of the enamel rods must be constantly borne in mind if the work is to be done correctly. Dr. Noyes has described the direction of the enamel rods so perfectly that I will quote from him directly. "In a bucco-lingual section through a bicuspid, beginning at the gingival line, the enamel is normally overlapped by cementum, and in the gingival third the rods are inclined more or less apically from the horizontal plane. The degree of inclination varies considerably. It may be as much as 12° centigrade, but it is usually not more than 6. In general the more convex the surface the greater will be the inclination. At some point between the gingival and middle thirds and the middle of the middle third of the surface, they are in the horizontal plane and at right angles to the axis of the tooth and at this point they are usually very nearly perpendicular to the surface. Passing occlusally from this point, they incline more and more occlusally until in the occlusal third they reach an inclination of 18 to 20° centigrade occlusally from the horizontal. The rods which form the tip of the buccal cusp do not reach the tip of the dentin, but the buccal slope of the dentin. Over the tip of the dentin cusp the rods are in the axial plane but in this position they are usually very much twisted. Passing down the lingual slope, they become more and more inclined lingually from the mesio-distal axial plane, and the degree of inclination is related to the height of the cusp—the taller the cusp the greater the inclination. At the developemental groove or pit they meet the rods of the lingual cusp which are inclined in the opposite direction. In a mesio-distal section the plan of arrangement will be seen to be the same, the tip of the marginal ridge corresponding to the tip of the cusp. In an incisor the arrangement is similar, the lingual marginal ridge corresponding to a rudimentary cusp.

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*Given as a descriptive clinic Ohio State Dental Society, December 1915.

REQUIREMENTS OF THE ENAMEL WALL

The first requirement of a strong enamel wall is that it rest upon sound dentin. The enamel in itself though inelastic is given a certain degree of elasticity when supported by the dentin. There can be no substitute for dentin as a support for the enamel wall, for we have no way of determining the amount of interprismatic substance that has been dissolved, out from between the rods by the backward decay of enamel and therefore little idea of the actual strength of the enamel itself. It therefore becomes imperative that the enamel be supported by sound dentin if permanency is desired. The second requirement of a strong enamel wall is that the rods which form the cavo-surface angle have their inner ends resting upon sound dentin. A very little study microscopically of sections of abraded teeth will demonstrate, that nature has provided the greatest possible strength for the enamel wall as it is worn away, and we may well imitate in our cavity preparation this form of enamel wall found upon abraded surfaces. In these cases the rods forming the cavo-surface angle always run directly to the dentin, and are supported by a triangular piece of enamel in which the inner ends of the rods rest upon sound dentin and the other ends are exposed upon the abraded surface. So in the preparation of the enamel wall we should make the last mentioned condition the third requirement if strength is to be obtained, that is: The rods which form the cavo-surface angle must be supported by a portion of enamel in which the inner ends of the rods rest upon sound

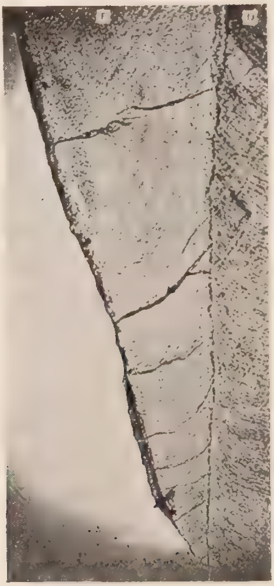

Fig. 1

dentin and the outer ends are covered by the filling material. The fourth requirement of a properly prepared enamel wall is that the cavo-surface angle be trimmed or bevelled. This bevel should include from one-fifth to one-third of the enamel wall and incline from 5 to 15° centigrade from its general direction. In terms of the structural elements of the enamel we have two general classes of cavities. First, those in which the rods incline toward the cavity wall and, second, those in which the rods incline away from the enamel wall. In cavities of the first class it is not always necessary to bevel the cavo-surface angle and this is to be done only when the rods which form the angle are in danger of injury. In cavities of the second class the cavo-surface angle is bevelled in order to gain support for the marginal rods. I believe that the preparation of the enamel wall should be practically the same in the insertion of all filling materials, with the exception of possibly a very slight variation if porcelain or artificial enamel is to be used.

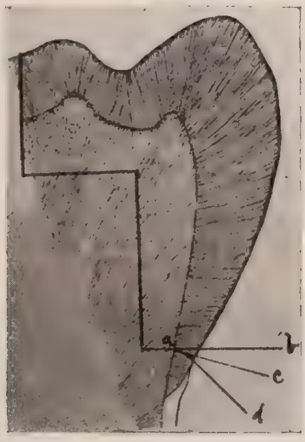

Fig. 2

REQUIREMENTS OF THE GINGIVAL WALL

Figure 1 is taken from Black's Operative Dentistry and shows very clearly the direction of the enamel rods in the gingival portion.

And now with these facts well in mind let us consider the preparation of the gingival wall. Let us first study what the proper preparation should be and then consider the correct method of obtaining it.

Figure 2, taken from Noyes, is an outline of the direction of the enamel rods in a mesio-distal section of a bicuspid. Note carefully the direction of the rods in that location where the gingival wall should ordinarily be placed. The line AC, shows that direction. Now if this wall was made absolutely flat as represented by the lines AB, or inclined occlusally, as is often the case, it will be readily seen that the enamel wall would be improperly placed and that the enamel rods in the angle BAC, would have no definite support. And so, if the enamel wall in this location is to be properly placed it must follow along the line AC, and if it is to have the proper direction and bevel of the cavo-surface angle, it must follow along the angled line AD.

As to the dentin in this location it should be absolutely flat or along the direction of the line AB. This is necessary for resistance.

Now let us consider instrumentation in the correct preparation of gingival walls:

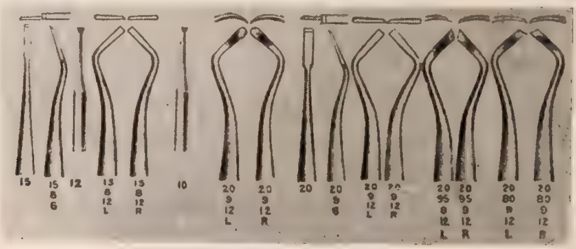

Fig. 3

Figure 3 taken from Black's Operative Dentistry shows the instruments used in the preparation of proximo-occlusal cavities in bicuspids and molars. Note particularly the instruments at the extreme right. Here are shown the enamel hatchets for planing the buccal and lingual walls of the cavity and the gingival margin trimmers for securing the correct preparation of that wall. Note the angle of the blade of the instrument in its relation to the shank and handle.

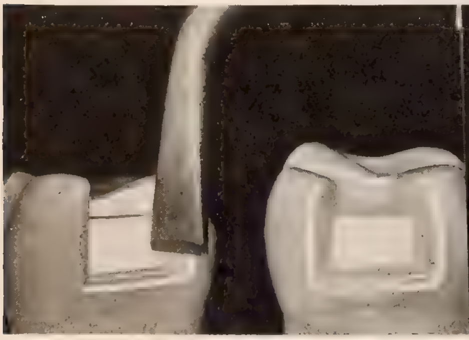

Fig. 4

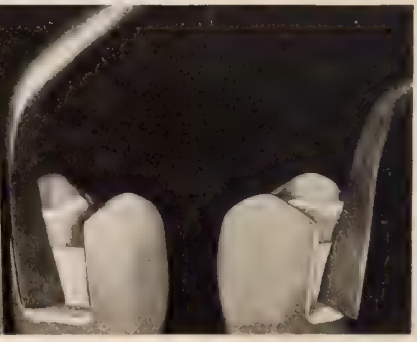

Fig. 5

Figure 4 shows the use of the enamel hatchets. This shows a proximo-occlusal cavity in an upper molar and the use of the enamel hatchets in planing the buccal and lingual walls and squaring the bucco-axial and linguo-axial line angles of this cavity. These instruments are Nos. 51 and 52 of the Black Set and the left one is here shown, the right one is used upon the opposite wall. Note the shape and direction of the gingival wall and the bevel of the cavo-surface angle.

Figure 5 shows an upper bicuspid with a mesio-disto-occlusal cavity and the use of the gingival margin trimmers in the cavity preparation. These are Nos. 79 and 80 of the Black Set and are right and left instruments. The figure upon the left shows the instrument in the distal portion of the cavity in squaring the gingivo-axial line angle. The figure upon the right shows the use of the same instrument in the mesial portion of the cavity in securing the correct direction and bevel of the cavo-surface angle. The instrument here shown is the right. The left is used in the opposite direction.

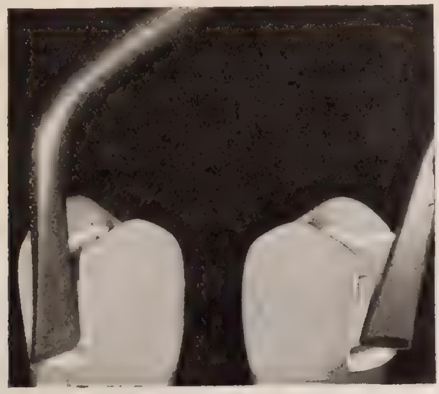

Fig. 6

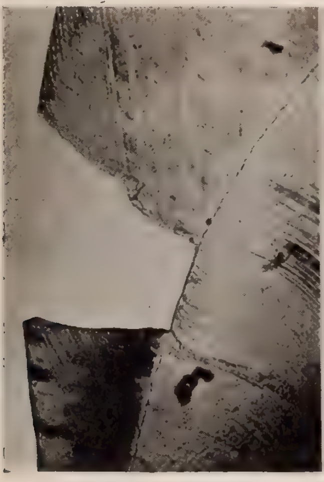

Fig. 7

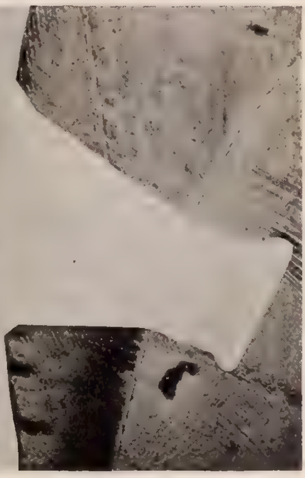

Fig. 8

Figure 6 shows the same cavity and the use of gingival margin trimmers Nos. 77 and 78. The figure upon the left shows the instrument in the distal portion of the cavity in securing the correct direction and bevel of the cavo-surface angle. The figure upon the right shows the same instrument in squaring the gingivo-axial line angle of the mesial portion of the cavity. The instrument here shown is the left. The right is used in the opposite direction.

The same care should be given the gingival wall in cavities upon the buccal and lingual surfaces of bicuspids and molars and the labial surfaces of incisors and cuspids.

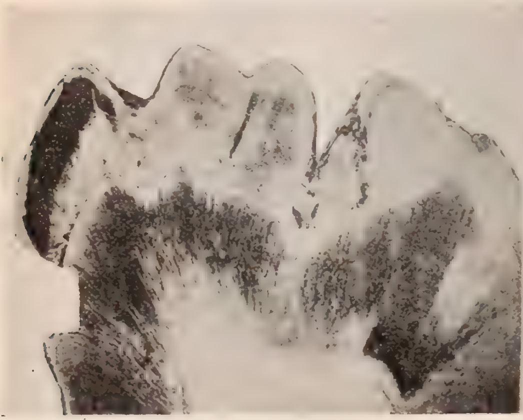

Fig. 9

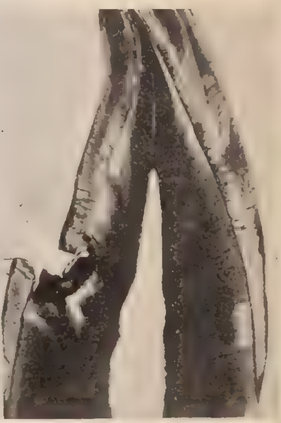

Fig. 10

Figure 7 from Noyes Histology shows the direction of the enamel rods and cleavage of the same in the preparation of a gingival cavity upon the buccal surface of a bicuspid.

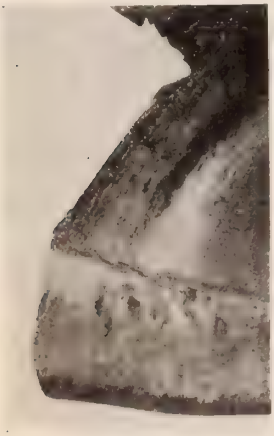

Fig. 11

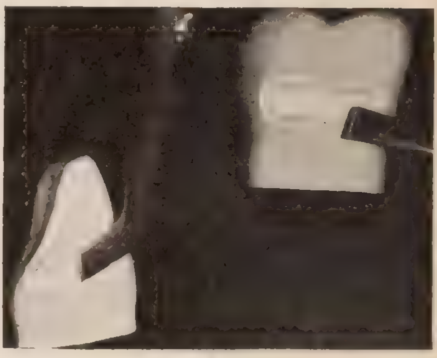

Fig. 12

Figure 8 shows the preparation of the same cavity. Note the direction of the gingival wall and the bevel of the cavo-surface angle. This is accomplished by the use of a straight or bin-angle chisel.

Figure 9. Same in a molar. Note direction and bevel of walls.

In cavities upon the lingual surface of the interior teeth the same points relative to the direction of the rods must be borne in mind.

Figure 10 from Noyes' Histology shows a cavity in a lingual pit in an incisor and the position of the chisel in opening the same.

Figure 11 shows the correct preparation of the gingival wall in the same cavity.

Figure 12 (upon the right) shows a cavity upon the buccal surface of an upper molar with the chisel in position for shaping the gingival wall. The figure upon the left shows a cavity upon the mesial surface of an upper central and the instrument in position for correctly preparing the gingival wall.

1554 E. 105 St.

COMPLEX CAVITIES AND CAST RESTORATIONS*

BY A. T. WILEY, D.D.S., TIFFIN, OHIO

The subject of this clinic was chosen to demonstrate a method of restoring to usefulness, (without crowning), a first bicuspid which had carried a compound approximo gold inlay.

The tooth had been attacked by caries through the faulty margin of the inlay, and in attempting to remove the inlay the whole palatal aspect of tooth was fractured, the labial wall alone remaining intact and apparently quite sound.

The tooth had been previously devitalized, so the removal of decay and formation of a flat seat at nearly right angles to the labial wall, and about level with gingivae, was easily accomplished.

After beveling all margins, I took a modelling compound impression of tooth and made an amalgam model. Over this I burnished and swaged 34 gauge, 24 karat gold with 7% platinum added, with the turned flange on the palatal, mesial, and distal aspects of cap burnished well over the beveled margins and extending under free margin of gum. This I placed in the mouth and inserted an iridio-platinum post of the length and size of the usual crown post, allowing post to project toward occlusal surface at least two-thirds of the distance. On this I built up and carved the desired restoration in the inlay wax, removed and cast with 24 karat gold.

The application of a combination of well-known principles has here produced the restoration of a first bicuspid to usefulness, and, the labial wall having been conserved, the natural and therefore the most esthetic effect to be obtained has resulted.

The matter of "tipping" the labio-occlusal angle is one of choice depending on the judgment of the operator in each case in hand.

The cavity preparation is not always easy, but persistent effort is usually crowned with success, and it is worth the extra pains.

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*Clinic Ohio State Dental Society, 1915.

A REVIEW OF SOME OF THE LITERATURE ON PERIAPICAL INFECTIONS AND ROOT SURGERY*

BY THOMAS P. HINMAN, D.D.S., ATLANTA, GA.

PROFESSOR OPERATIVE DENTISTRY AND ORAL SURGERY, ATLANTA DENTAL COLLEGE

WHEN LESS THAN ONE MONTH AGO the author of this paper was asked to prepare something for the program of the Ohio State Dental Society in place of Prof. Hermann Prinz, he accepted rather reluctantly for fear he should not be able to measure up to the high class into which he was so suddenly thrust. After giving the matter due consideration, he felt that a review of the literature on the relation of the infections of the mouth to general systemic disordors, as well as their prevention, might not be amiss. It was found, however, that the literature was so voluminous that only a small portion of it could be reviewed, and therefore this paper will review only that portion that seems of greatest importance.

The accusation has been made by the medical profession that the dentist, by his imperfect technic and uncleanly methods, has infected a great majority of the root canals that he has attempted to fill, thereby causing an infection of the periapical area with an organism which, though not a serious menace to the comfort of the tooth itself, by hemytogenous invasion causes infection in parts remote from the point of origin. Dr. T B. Hartzell says (*Journal of the National Dental Association*,—Nov. 1915, page 333,): "Within the past two months we have inoculated 112 rabbits with 22 different strains of streptococci of dental and oral origin. Many lesions have been produced by these inoculations, which work we hope to report upon finally within the coming year. Our work thus far points strongly to the probability that streptococcus viridans, which is of the salivarius type found in focal abscesses, pyorrhea pockets, and in the saliva, are alike capable of producing grave lesions." The streptococcus viridans is of the salivarius type, and when I was in Minneapolis last summer spending a week there with Dr. Hartzell, he showed me plainly a number of secondary infections in the liver and the heart muscles and joints of rabbits that had been produced by simply spitting normal, or what we would consider normal saliva, on an agar slide, and making a culture, he found the salivarious type of streptococci, and by the injection of this strain, he produced the same lesions that he produced from the streptococci isolated from the periapical infection. I thought that was an extremely interesting and important point, and wanted to clarify it at this time. "During the past year, we have been able to find post-mortem human lesions particularly of heart valve, heart muscle and kidney, which compare very closely with the experimental lesions produced in animals, which human lesions, we believe, are produced by the same organism as that used to produce the experimental lesion in animals."

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*Read before the Ohio State Dental Society, Columbus, Ohio, December, 1915.

Still says ("*Practical Bacteriology*, third edition): "S. Viridans produces endocarditis in experiments on animals."

In an article in the *Journal of the American Medical Association*, Dr. H. L. Ulrich, of Minneapolis, has made a corollary of dental abscesses, and found in 500 cases that there were secondary infections. In these he found 1350 dead teeth; of these 976 had root canal fillings; of these, 669 had abscesses; 439 had abscesses due to caries or accident, a total of 1108. Dr. Ulrich coins a new word to describe these secondary infections, calling the condition "streptococcious."

The thing that interests us most is the fact that out of 976 teeth with root-canal fillings, he finds 669 with abscesses, or a percentage of 67.5. He also reports 37 private cases in which there were 131 dead teeth; number of dead teeth with root canal fillings, 102; number of these teeth abscessed, 76, a percentage of 74.7.

These findings are most alarming when we are told by Hartzell and Henrici, *Journal American Medical Association*, March 27, 1915, that in 162 cases of periapical abscess 150 yielded streptococci. They inoculated 24 rabbits with S-Viridens, taken from apical abscesses, and produced heart lesions in five, kidney lesions in seven, three lesions in the aorta, and two in joints. Rosenow says, this streptococcus group seems to have in its different forms a wide range of affinities for various structures, or seems to be selective in its action; and Ulrich divides them into five groups; first, rheumatoid; second, cardio-vascular; third, asthenic; fourth, gastro-intestinal; fifth, genito-urinary, each group having its selective action. In examination of 76 cases of streptococcus where there were alveolar abscesses, 39 had rheumatoid conditions; 36, cardiac lesions; 33, secondary anemia; 30, chronic amygdalitis; 20, pyorrhea; 19, albuminuria; 12, caries; 10, viceroptis, and the rest scattered in various conditions. He further says that these periapical foci are not primarily dental but secondary deposits, hematogenous in origin. However, Billings, Rosenow, Gilmer, Moody, Hartzell, Henrici and Rhein believe the infection is from bacteria carried into the root canal, passing through the apex and finding lodgment in the apical area. Henrici says (*Journal of the National Dental Association*, November, 1915, page 335): "Peridental inflammations are primary lesions, the organisms gaining access to the tissues either through the pulp canal or at the gingival margin, and not secondary to some other focus."

It seems that the case against us has been made pretty strong. Kremer in THE DENTAL SUMMARY for April 1915, page 272, says, that granting the truth of Dr. Ulrich's position, it becomes apparent that our surgery in pulp removal and root filling has nothing to do with this causation except to create an area of lowered resistance, thereby encouraging colonization of bacteria already afloat in the blood. The truth of this position has not been worked out in a satisfactory scientific manner, and still leaves us in doubt as to the proper handling of the apical area so as to prevent the production of a point of lowered resistance, thus forming a nidus to catch any floating infection.

Dr. M. L. Rhein (*Items of Interest*, November, 1915, page 837,) says, that the correct treatment of pulpless teeth must eliminate the possibility of periapical re-infection, and recommends that every portion of organic matter that exists within the tooth should be entirely removed, and says it is necessary to reach the very end of every root—in fact, to pass through the end of every root. He believes the filling should pass beyond the end of the tooth, and if the filling material does not pass through the end of the root and seal every foraminal exit on the exterior of the root, you cannot guard against re-infection. By sterilization with ionic medication, Dr. Rhein believes that he is able to destroy the infected area in accessible cases, and by placing his fillings beyond the root apex to guard against re-infection, that regeneration of bone will occur in the rarefied area, provided, of course, that the apex is not necrotic.

I believe that to Dr. Clarence J. Grieves belongs the honor of being among the earliest, if not the earliest, to report specific cases of apical infection associated with rheumatoid arthritis. This was done in conjunction with Dr. Baer, Orthopaedist at John Hopkins, in an article entitled "Systemic Pus Poisoning Associated with Diseased Dental Apical Regions," *Items of Interest*, November 14, 1910, in which he reports several cases of rheumatoid arthritis associated with periapical infections which were not cured until the foci were destroyed. During the discussion Dr. Grieves challenged those present to tell him how to differentiate between the curable and incurable cases. None replied, but there is no difficulty about replying. Those who are skilled in reading radiographs can readily detect a truly necrotic apex, and in such conditions, apicoectomy usually is a reliable procedure, though, as Dr. Grieves truly points out, not so useful in the molar region. Where there is no actual death of the end of the root, or where its existence cannot be positively determined, aseptic root canal treatment and filling promises a cure, and if the promise be not fulfilled the end of the root may even then be amputated, with the assurance that the main portion of the root is not a contributing agent in the continuance of the disease. Dr. Grieves, *Dental Cosmos*, October, 1915, calls attention to the fact that it is impossible with our present methods to determine the vitality of the apex in cases that show distinctly rarefied areas. I would like just for a moment to say a word about apicoectomy. They speak of apicoectomy as a simple operation, that anybody can do, and that is true, anybody can do it, but in checking up the changes after apicoectomy by the radiograph, I have found that my apparent successes were not just what I thought they were, and the question might arise, will there be an attachment of the membranes—I am not saying what membrane—that fits over the edge of the stump, this stump being partly dentin and not entirely cementum? Another question is, in apicoectomy, having dentin exposed, and the dentin being full of tubuli, doesn't that make a point for re-infection? We must think of those things, and cannot pass over them lightly. Dr. Grieves believes that the forcing of any substance in the shape of root canal filling into the apex, materially affects this joint and will be productive of irritation and really defeat the object in view. Now, here is a thought, every tooth in the mouth makes a joint, and what orthopedic surgeon would think of forcing some foreign substance into the joint on which he was operating? I spoke just now of the number of radiographs I have made. I am not boasting about that, but I began radiography in 1897, and have literally taken thousands of these pictures, and I am reviewing some of the canal work I have done in the past, and I find some of the successes I thought I had are proving really the apples of Sodom. Dr. Grieves claims that he has cut down on the apices of roots thus treated, and while the radiograph showed no rarefied area, he has been able to find streptoccocus infection around this extruded material, and is of the opinion that in a majority of instances, apicoectomy, or extraction and curettage, while radical, is the only means of curing the disease. The question of extraction is one that is interesting me greatly, and I am firmly convinced that after every extraction unless we make curettage of the socket, we haven't done our full duty, because in a number of instances where the sac was not brought out by extraction, or curettage the radiograph will show a rarefied area, and retention of infection in the pocket, although it has no external opening. Hartzell says, *Journal of the National Dental Association,* November, 1915, page 341—"The use of vaccines, however, is liable to create a confidence in them which is likely to make the dentist less careful in eliminating all local foci, and until such local foci are removed it can hardly be expected that a vaccine will give any permanent relief."

Dr. Grieves also reports that on account of the fact that the apical fifth of the root is entirely cementum, care should be used not to damage this tissue, and I gather from what he says that it is safer to leave the apical-foramina unpenetrated and the tissue alive than to deliberately penetrate the apex and force the filling through. In a number of cases of extracted teeth he has found where the root filling did not extend to the apex and a small portion of the pulp remained alive in this area, that the cementum had attempted a repair and in some instances had entirely closed the apical foramina. He condemns the use of arsenic and other escharotic medicines in the root canal. If this is true, our methods of canal surgery and medication must be radically changed. It has been my experience in the thousands of X-rays I have taken, that although many roots were imperfectly filled, when I attempted to remove the canal fillings, where there was no rarefied area, I found vital apices, and wherever I find a vital apex, I leave it alone. He recommends the following technic in pulp removal:

> "We would at this point make a strong appeal—(1) for the surgical removal of the dental pulp; (2) for the discontinuance of the use of arsenic, except in unusual cases; then to be applied, not to the pulp, but to some sensitive spot in the dentin, for a short time, so that by slow absorp-

tion, only the coronal pulp may be affected; (3) that the apical third of all pulps be removed surgically, as far as possible; (4) that the immediate cemental foramina, containing blood-clot, tissue, detritus, and exudate, consequent upon the operation, be allowed to drain in the presence of mild iodin solutions, iodoform, or a weak formalin solution, which have been pumped into the field and carefully sealed there, away from saliva, by temporary cement stopping; (5) that the foraminal contents be finally removed, working in these solutions. This may appear old fashioned, but in reality it is the most modern bone surgery, and follows the most approved practice in operations for osteomyelitis, which this diseased area and tooth apex resembles."

I have always been, and am still, opposed to the common, careless practice of pressure anesthesia. I cannot but condemn with every power I have in my body the process of just picking up cocain, and without previous preparation, forcing the medicine down in the canals, making no attempt at sterilization. So the variation that I have used—and I told Dr. Grieves about it, and he said he would try it out—was to apply, not arsenic, because I am against the use of arsenic, but Buckley's desensitizing paste, which will desensitize all of the coronal portion of the pulp within twenty-four hours. Apply this, and you can cut down and clean out the pulp chamber, and then use pressure anesthesia. This is the technic I am using, because I want to cut out arsenic.

Dr. Elmer S. Best, (*Items of Interest*, July, 1915), "Responsibility of the Dentist and the Care of Pulpless Teeth," says that the dentists have now reached their crisis and are today passing through the most revolutionary epoch in the history of dentistry. The reason of this is the pulp canal proposition has, in the past, been considered a comparatively simple and unimportant one; today it has been charged by the thinking members of the medical and dental professions as the cause of as much if not more suffering than any other operation." He makes a strong plea for the practice of aseptic surgery in canal operations and gives a most complete and practical technic which he follows. He believes the canals should be filled to the apex and not through.

Most modern writers condemn en tout the use of germicidal and antiseptic preparations for filling root canals, that now flood the market. Any operator of experience who has observed the results of these materials in the root canal must certainly agree with Drs. Best, Rhein, Ottolengui and Grieves that these materials should be condemned. Both Prinz and Buckley, who are our foremost authorities on dental materia medica, have shown that there is no permanent germicide that can be sealed in a root canal.

To Dr. John R. Callahan, of Cincinnati, must be given great credit for the painstaking work he has done in the technic of opening up, cleansing and filling the root canal, and I believe that some day a monument will be erected to him such as we are soon to dedicate to our beloved Miller. The introduction by him of the chloroform-rosin solution was an epoch-making innovation.

It is rather a surprising fact that a man of such eminence as Dr. C. Edmund Kells, of New Orleans, *Items of Interest*, July, 1915, takes the opposite view from the authorities previously quoted. He practices immediate filling of root canals after the removal of their septic content, believing, by cleansing the canal and it is made antiseptic and hermetically filled, that nature does the rest. He says, page 482, "After removing the cause with some non-absorbent and antiseptic filling material, the cause of the abscess has been as clearly removed as if the tooth had been extracted. Re-infection of the canal is rendered impossible and nature at once proceeds to take care of the infection (?) within the alveolar process, and a cure results. The facts are that just such teeth can be filled in this manner successfully, so we must adapt our theories to our clinical facts and set to work to learn why this is good practice."

The criticism I would make of this procedure is that if the cementum is necrotic, it would be impossible to destroy the infection beyond the apex, and if what Buckley and Prinz say is true, that there is no permanently antiseptic root canal filling material, then Dr. Kells is wrong.

The fact is that some of these apical areas which are infected and are the causes of systemic disorders cannot be reached by the ordinary methods of medication, and it is only by the ionic method that we are able to reach the infection at all. There is one thing that we all must do, and that is, practice aseptic instead of antiseptic canal work, and if we follow the technic as laid down by Drs. Best, Rhein and others, we can most certainly do an aseptic operation.

I believe that our responsibility in root canal work does not cease when the operation has been completed and we have made a radiograph to prove our work, but on account of the fact that abscesses have appeared around the apices of roots that were apparently perfectly filled, we should begin to check up our old work by radiographs so as to guard our patients' health, and even their lives, by seeing that no infected areas are retained around the apices of the teeth that we have filled.

It is evident from results thus far obtained in the medication of root canals that our old methods, sterilization by absorption, are unsatisfactory, because it must be reasonable to suppose that every canal which has been filled has gone through the usual form of medication. The only thing that seems to offer any relief in our present dilemma is electro- or ionic-medication. This is being done quite extensively by Rhein and his followers, using the zinc chlorine ions. The electric current they recommend goes as high as from two to five milliamperes. No doubt they produce sterilization in the apical area, but electric current of this intensity is certainly destructive to tissue. In the experiments I have made, I have found that a current about one-fifth of a ma. will cause coagulation of albumen, a condition most undesirable. The best results that I have obtained have been from two per cent. of aqueous iodin and one-fifth of a ma. current. I have apparently been able to destroy the infected areas around root apices in some of the favorable cases. In all infected roots, with me, whether the X-ray shows a rarefied area or not, this iodin ionization has become standard practice.

In the filling of root canals, a thing to which I have paid more than usual attention, I am convinced that in all cases where there is a rarefied area beyond the apex, that all these cases should be filled beyond the end, not with a gutta percha point, but with chloropercha or rosin. In all fistulous cases, this has been standard with me for many years and advocated as far back as 1900. That gutta percha will remain encysted in the tissues is a fact too well known to receive particular and specific comment.

In filling root canals which have been infected, the technic as advocated by Dr. J. R. Callahan is unquestionably the best to my knowledge. The point that should receive more attention than is usually given is that the canal points should be thoroughly packed in the canal (Callahan, August *Items*, page 587,) forcing them down with a steel plugger, allowing the chloropercha to pass beyond the apex. In canals where there is no infection, it is unquestionably the better practice to attempt to fill the canal to the apex and not beyond, and the technic of cleansing as indicated by Grieves is certainly the most rational, The position I have taken in this regard is confirmed by the observations of Ottolengui in his discussion of Grieves' paper, *Dental Cosmos*, October, 1915."

Whether the periapical infection is hematogenous or directly caused by the dentist is not the question of greatest importance, but the problem of treating and filling root canals in such a way as neither to infect them nor to produce an area of lowered resistance around the apex which will be a nidus for infection material to lodge, is the most serious problem that faces the dental profession today. I am thoroughly convinced that the forcing of escharotics beyond the root apex and the use of an electric current of too high an amperage, are both equally faulty in their finality.

Comment has been made by the medical man that the dentist always wants concentrated solution, while he—the medical man—works with dilutions. This is a just criticism and I feel sure that if our medication is changed so as not to destroy tissue, our results will be eminently move favorable.

I can not agree with Dr. Ottolengui as to the ease with which radiographs of diseased apices are read, and agree with Dr. Grieves that it is almost impossible to determine from the radiograph the vitality or non-vitality of the pericemental apex in rarefied areas; true there are some instances where there is a distinct loss of the cemental apex and these are readily seen and recognized in the pictures, but the apex may be dead and not show any loss of cementum. I say this after an experience of seventeen years in which I have literally made thousands of radiographs. Dr. O. speaks with much certainty as to the results in apicoectomy. In checking up some of my work and the work of others in this operation I have found quite a few that although they were great showed signs of rarefication and in instances on account of constitutional symptons extraction and curettage had to be resorted to to destroy the focus of infection. I do believe however, that if apicoectomy can be successfully performed without letting the saliva get into the opening and where no packing is resorted to, the chances of success in this operation are greatly enhanced.

DISCUSSION

Dr. J. R. Callahan, Cincinnati: I am sure that I voice the sentiments of this large audience when I say to Dr. Hinman that we enjoy his presence. We are gratified and have profited by the paper he has read to us. To prepare so good a paper in the short time given him proves his versatility. This is but another evidence of Dr. Hinman's loyalty to his profession, a loyalty and devotion that are appreciated and rejoiced in by every active dental worker in the United States.

It has been said that 67 per cent. of the root-canal fillings result in abscesses. Where were those observations made? Were they made in regions that were under the influence of colleges that failed to treat root canals in anything like a proper manner? I am sorry to say that in many of the teaching institutions of the country they devote a great deal of time to the preparation of cavities, but when it comes to filling a root canal they simply open into the chamber and then undertake to fill a canal which they cannot see. No wonder that 67 per cent. are failures, and when we publish a percentage of failures under those conditions, that is not fair. Our methods of instruction must be changed and our teaching institutions are the places to do it. I am not in the habit of criticising colleges, but in this line of work they should be criticised by the profession at large, and it is a crime on the part of the profession to *permit* young men to go to institutions that neglect such an important work. (Applause.)

It was my pleasure to lecture recently in one of the colleges in Chicago, and I saw work going on there that pleased me all the way through. Every student doing root-canal work had to X-ray his own patient before and after treatment. They were getting a training that means something, and I saw there a completely equipped bacteriological laboratory, and there were about one hundred in the room hard at work at the details of bacteriology in all of its phases. How many of us have had those advantages? And adjoining that was a large library, and there were twenty-five or thirty young men in there with pads and pencils and books, working and *studying*. Has it been your pleasure to see twenty-five or thirty students with their papers and text books doing *real* study? It has not been my privilege to see any of you doing that. (Laughter.) The world at large, assisted by the medical profession and by a few dentists are going to classify a lot of us, and we will not be very well pleased with that classification unless we can meet these conditions.

Infections, local and general, I have not touched upon in a public way yet, because it has taken me twenty-five years to get as far as I have been able to get in the approaching and getting in condition *to* treat the conditions about the apical foramen, and in that effort, instead of *an* apical foramen, I find from one to nine foramina. We are going to wake up to something in that region. No wonder we cannot get through some root canals.

I am a bit premature with this. Dr. Hinman stated that the foramen was sometimes closed very solidly by secondary growth of cemental tissue. I think there is a mistake about that. If you will extract a tooth, get the moisture out of it slowly, and then lay it in your electric furnace and bring it to about 2000 degrees of heat, at least 2000—it won't hurt to go to 3000—then allow it to cool gradually, you will find the lime substance of the tooth fairly well fused together, so that you can handle it easily, and will have to use force to break it. Then use a 2-inch lens, or an 8 or 10 diameter lens, to get a magnification, and you can see the foramina; under these conditions you can count them; they are hard to photograph on account of the contour of the tooth, but you will find the foramina there running from 1 up to 6 or 8 or 9 and doubtless find holes that look like foramina but are not.

Prevention is my work. I am trying to stick to what I am pleased to call the strategic point. I do not see that we can treat infections until we get control of the strategic point, and that is the apical end. These multiple canals are a serious obstacle, but I hope we can classify these multiple canals. They occur more frequently in certain roots, but it means we must resort to chemical means of preparation at least, and what are we going to do about sterilizing the areas beyond the root end? If an antiseptic solution will destroy tissue, and this tissue is infected, (not invaded—invasion, you can take care of, but an infection is another matter)—you must, to cause the immediate death of the infecting organism, destroy the tissue. How can we get rid of that organism without destroying the tissue?

Dr. Hugh W. MacMillan, Cincinnati: There is considerable doubt among certain members of the profession whether infections found in the mouth cause systemic diseases, as though the Research Institute was overdrawing some of these things. These findings have been verified not only in Hartzell's and Rosenow's laboratories, but also in our own state of Ohio, and particularly in Cincinnati. In Cincinnati we have been fortunate in having the earnest cooperation of physicians in this oral hygiene or pus-eradicating process. In the new $4,000,000 hospital there is a complete dental equipment, unexcelled anywhere. We have turned over to us in this hospital seven different rooms for the treatment of mouth infections. We have a large operating room; a special sterilizing room, which contains only a sterilizer, filling the whole room; a prosthetic laboratory; a dressing room; an anesthetic room for starting patients under the anesthetic before taking them to the operating room; and one of the most unique features, is a room set apart and equipped with a microscope and incubator for examining these infections of the mouth.

When Dr. Harvey Wiley was present in Cincinnati in the last oral hygiene movement, it was our pleasure to show him through the Cincinnati Hospital, and particularly through the dental department. While he was in the dental operating room a patient came walking in that we started to treat a few weeks before for a polyarthritis. When he was first treated he was flat on his back, and had been that way for several months. We treated him first in his bed, and in a few days he was able to come over to the dental operating room in a wheel chair. A few days later he was able to walk over and the day Dr. Wiley was present the patient was to be discharged—we cannot say cured, but clinically cured—at least able to walk out and go back to his work.

We have had many cases such as that, cases with heart lesions, nephritis, arthritis, and neuritis. Any disease that is caused by an infection can come from a mouth infection. The medical department has come to the point where any disease which is not making successful recovery is turned over to the dental department for cleaning up the mouth. This hospital is open to all and you will all be welcome there.

We haven't gotten so far that we talk over your heads; we are simply learning these things for ourselves. Come down and learn with us. This is in Ohio, and we are doing these things every day. With the support and assistance of Dr. Callahan we expect to bring out in the near future some methods that will revolutionize the treatment of root canals in dentistry.

There is one thing I think of particular importance in the treatment of these infections of the mouth. It is important when a patient is completely run down, perhaps with chronic nephritis, heart lesion or various other general symptoms, that we proceed with the dental treatment carefully. We had an unfortunate instance when we moved into the new hospital. A patient was referred to our service with nephritis; his joints were swollen; he had cardiac disorders and the most filthy mouth we ever observed. His teeth were just covered with tartar and quantities of pus were exuding from the gums. Instructions were given to the junior who had charge of the case, to proceed carefully, doing a little at a time; but just one treatment, which did not consist of extracting a single tooth, reacted on the patient to such an extent that in forty-eight hours he was dead. He had received no medication, and no other surgical treatment except to clean the mouth. So a point that should be emphasized, when a case is referred to you suffering from some systemic disease, is to proceed carefully. If it is extracting, you should take out one tooth at a time; if a gum disease, give a very general treatment, just massaging the gums with a swab of cotton wrapped around an applicator with boracic acid solution, and instruct the patient to keep his mouth clean. Do a little at a time until you have accomplished your work.

If Dr. Callahan should lecture every day on the anatomy of the root, his time would not be wasted. He is so thoroughly interested in the end of the root, and knows so much about it, that he takes it for granted the great majority of the dentists know as much about it as he. It is an interesting fact that the pulp of a tooth, when it gets to the apical third does not have a single filament, but there are from one to nine filaments which pass laterally to the apical cementum and peri-cementum. Dr. Callahan calls this the strategic point, and that is very well named. That point is so strategic that the whole practice of dentistry is balanced on that single point. If we cannot properly treat and fill this joint, to make it as perfect as any other joint in the body and keep if from becoming an area of secondary infection, our whole root canal treatment must fail, because the surgeons are demanding that we produce results in the mouth such as they are producing in other parts of the body. It means in three or four years there will be such agitation in root canal work that the public will not allow you to extract a pulp.

The most important part of dentistry is the proper treatment of root canals and proper filling. If you will examine X-rays of teeth, choose what you call a perfect root canal filling, a filling that extends to or up through the apex of the tooth, and you will often find an area of rarefaction around that tooth. You sometines say, "What are we going to do? This root canal is perfectly filled, and we cannot do any more;" but that root canal is not perfectly filled, and it is due to the fact that these other six or eight fibrils have not been thoroughly cleaned out, and these areas remaining unfilled are areas of lessened resistance, in which the bacteria enter from the blood stream and develop as they would in a test tube. As to the sterilization of this strategic point, the only treatment worth while, with the exception of the possibilities of this ionic medication, is Dr. Callahan's treatment by sulphuric acid. The treatment is this; whether the tooth be putrescent or whether you extract a live nerve, it is absolutely essential that the sulphuric acid be used afterwards, the sulphuric acid carbonizing these little filaments, which are then removed by the effervescence produced by the action of the sodium bicarbonate on the acid. You cannot get a broach in there, and the only way to remove the entire pulp is by chemical means. The most satisfactory method of filling these different canals is by his dilute resin solution.

This root canal work of Dr. Callahan is entirely out of my line, but I have become so interested in it and I can see that the importance is so great that we are changing our whole regime in the treatment of the mouth in the hospital, the investigation of this subject being our main object. The work done by Dr. Grieves in the rebuilding of cementum and covering over these areas is most creditable, and if that can be accomplished, it will be a panacea for all root canal ills, but bone will not grow in the presence of infection, and until we can treat these areas without the introduction of any infection, of course this proliferation of the cementum will not occur.

Dr. Hinman's paper was most excellent, and brought to our attention again one of the greatest problems there is for the dentist of today to solve.

PRINCIPLES IN RENTENTION OF DENTURES*

BY H. V. COTTRELL, D.D.S., COLUMBUS, OHIO

PLATE DENTURES MUST BE SUPPORTED by underlying structure to resist the force of mastication brought to bear on the denture, and they must be maintained in position during their use. They receive their support:

First from the mucous membrane alone, and *Second* from mucous membrane associated with tooth structure.

They are maintained;

First by means other than tooth structure, and *Second* by mucous membrane and tooth structure.

The support in the first class is usually sufficient to withstand the force of mastication if the maximum area available from the mucous membrane is employed, and if the force applied is uniformly distributed. Such support is usually insufficient when conditions in the opposing jaw present but a few anterior teeth for mastication.

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*Read before the Ohio State Dental Society, Columbus, December, 1915.

Support in the second class being divided between mucous membrane and tooth, the latter usually bears the lion's share. Teeth so used may be looked upon as more or less temporary by virture of their being overworked. For this reason they should, whenever possible, be connected with each other to further fortify them against the force to be placed upon them.

Maintenance in the first class depends upon two factors—adhesion and atmospheric pressure. Adhesion or molecular attraction is the primary factor. This force is utilized to its maximum capacity when the area covered is greatest, and when uniform bearing of the denture on the membrane is obtained. To accomplish this phase of adaptation, it is imperative that a careful examination of the tissues involved be made from the standpoint of their density. The bearing of the denture on the hard areas, wherever found, must be relieved to just such extent as is necessary to bring about that uniformity of bearing which is required. Any more than enough to gain this end is detrimental, inasmuch as it weakens the molecular attraction by making lighter the bearing on these parts.

Adhesion is also strongest when the saliva is thinnest; the condition permits closer contact between the denture and membrane than is the case when the saliva is of a thick, ropy character.

A moderate thickness of the tissue intervening between the membrane and the bone is essential to the closest adaptation of the denture. The thin tense condition of the membrane prevents this close contact.

The very soft areas should be compressed, but not displaced. Means for securing this should probably better start in the taking of the impression.

Atmospheric pressure—the secondary factor in maintenance in the first class, is of necessity a temporary force, inasmuch as it can only exist where there is unequal air pressure. This involves at least a partial vacuum. Since "nature abhors a vacuum," the so-called vacuum chambers are soon obliterated by the development of new tissue therein. Following which the force of retention becomes adhesion—not atmospheric pressure.

There is a positive influence in favor of retention when the teeth are so articulated as to bring force to bear on the denture in a vertical direction. Forces exerted in other directions are negative to retention.

There should be such close approximation of the periphery of the plate to the cheek and lip tissues as to create in them curtains, as it were, to cover the edge of the plate snugly and thus prevent the ingress of air at this point. To more effectually prevent this ingress of air at this point, at times an extension of the periphery may be built to become slightly buried in the buccal and labial tissues.

A slight impingement of the periphery of the plate on the ridge is a valuable adjunct to these other features. This impingement may be accomplished by a slight scraping of the cast in amount equal to the compressibility of the tissues involved.

Or in cases where it is practicable to use modelling compound for the impression, and where a means is provided for chilling the material at this point while it is under pressure, the same purpose may be accomplished.

The movement of the muscles of the soft palate determine the posterior edge of the plate. The point at which these muscles begin to move may be observed by having the patient utter the syllable "ah." The posterior edge of the plate should come to this point, but no further.

Near the posterior margin the plate should be made to impinge upon the tissue by scraping a narrow groove in the cast which will be represented on the denture by a bead.

Modification of the cast at the edge of the plate anywhere must not be sufficient to cause other parts of the plate to be held off from contact. Neither must there be such impingement on the muscular tissues on the periphery anywhere as to cause a break in the adhesion.

In case there exists a mass of very soft pendant gum tissue, it should be surgically removed.

The principles involved in the retention of a full lower are no different from those in a full upper, except that we may add gravity to the lower.

Maintenance in the second class, where it depends upon mucous membrane and tooth structure involves

First: Adhesion alone,

Second: Adhesion and contact of denture with tooth structure.

When maintenance is by adhesion alone, as in a partial denture, not depending upon natural teeth anywhere, it is usually an insufficient force. for the area is much less than in full denture. Also, it is impossible to protect a large portion of the periphery of the plate from the easy ingress of air.

When contact of tooth structure is added to the force of adhesion, as is effected by the use of a stay clasp, a spring clasp, a ferrule, or any special attachments to natural teeth, which permit of free movement of denture during mastication, complete maintenance may be obtained. In a slightly different class of cases—those with rigid attachments to natural teeth—the maintenance is still divided between adhesion and tooth structure, and is effective only during the efficiency of the attachment.

Since the scope of this paper was the treatment of the underlying principles of retention, I shall attempt no discussion of purely technical features.

7 E. Town St.

The pessimist who goes about wishing he had never been born is not the only one who regrets it.—*Nixon Waterman.*

CONDUCTIVE ANESTHESIA IN THE GENERAL PRACTICE OF DENTISTRY*

BY J. P. HENAHAN, D.D.S., CLEVELAND, OHIO

THE ADVANCEMENT OF DENTISTRY as a scientific profession depends like medicine upon the efforts of its individual members. We have reason to be justly proud of the advancement which we have seen during the last few years, as well as of the men who have made this advancement possible and who at the same time have made their names famous in the history of dentistry.

Observers within our ranks have been of the greatest of service to medical research in various branches, and each year sees dentistry occupying a more important position in the opinion of the medical profession with which there is a constantly growing tendency to work in unison.

It has often been regretted that the two professions did not from the start unite their efforts and develop in common; and while undoubtedly some advantages would have accrued from such an arrangement, I firmly believe that humanity has profited to a much greater extent with conditions as they were and are, and that dental science has been perfected much more rapidly for the same reason. I believe however that the future will see the practicing dentist a medical as well as dental graduate.

Among the important branches of science which dentistry has helped in developing, that of anesthesia stands foremost. In fact the dental profession is entitled to the honor for first practicing modern anesthesia as we know it today.

General anesthesia through the agency of nitrous oxid gas was first induced by Dr. Horace Wells, a dentist of Hartford, Conn. and shortly afterward Dr. Morton, a former student of Wells, employed ether to induce anesthesia, a dental operation being performed in each instance.

Dentistry was quick to grasp the advantages of cocain as a drug for the production of local anesthesia, and divides with medicine the honor for the development of that science.

It seems strange that, with these well-founded claims to encourage us that dentists have not more universally employed anesthetics in their work. That we have not done so is evidenced by the fact that probably 95% of all dental operations are still performed without the assistance of any anesthetics.

In his writings upon the Shockless Operation and Anoci Association, Dr. Crile states that all of us in our sleeping and waking hours are constantly experiencing various degrees of shock. The majority of these shocks are of practically no importance, but some are sufficient by reason of their severity or repetition to cause a disorganization of the nervous system. Dr. DeFord has written the most comprehensive description of shock which I have seen. It is as follows:

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*Read before the Ohio State Dental Society, Columbus, Ohio, December, 1915.

"Shock is a condition of depression produced by exhaustion of the medullary centers controlling respiration and circulation, by a too sudden, too painful, too forcible or too prolonged stimulation of the afferent nerves, the essential phenomena being a diminution of blood pressure. Shock generally may be considered as arising from psychical or physical effects. Psychical or emotional shock usually arises from fear or dread."

With this knowledge before us we can have no difficulty in recognizing the fact that the general practice of dentistry in its various phases may and does from any of the foregoing reasons often produce shock.

As dentists we are in position through our daily work to note the cause and effect of shock, and consideration of the situation will reveal the fact that not always is it the patient who is the sufferer, but oftentimes the dentist, due to the mental and nervous strain to which he is subjected in some of his trying cases.

So wide spread among the public is the fear of the dentist, that it would seem that it has almost become a natural condition. This would appear to be the result of the accumulated effect of the pain and fear caused by succeeding generations of dentists since dentistry was first practiced in its crudest forms. Have we the right to continue in this way or shall we follow the path which science has opened for us and as a united profession adopt all means which makes humanitarian dentistry possible? The time has about arrived when this is not to be considered a matter of privilege with us but as a matter of compulsion. The world knows that painless and shockless operations are possible and is demanding that such services be rendered.

The general use of anesthetics would help to prevent shock and at least to an extent correct certain dangerous customs which were practiced in the past. We all know of the number of practically good teeth which were devitalized to allow for a restoration without pain, and we must recognize the fact that at least some of those teeth were lost for want of proper root canal treatment and filling. Not only this, but while this imperfectly filled tooth existed in the jaw it was a constant menace to the general health. The apical abscess may have been a focal point for some local or general infection such as rheumatism, arthritis, lesions of the heart, diseases of the skin, or infection of the eye or ear, etc. etc. In recognition of this possibility every able medical diagnostitian of today bears the teeth in mind when searching for some obscure cause of disease.

Painless dentistry, the term which only a short time ago was wholly the term of the fakir, is today synonymous with perfect dentistry. Dentistry today needs to be not only free from pain and shock, but all other disagreeable effects, if the dentist is one whose ambition and energy have stimulated him to perfect himself in the knowledge that is to be had.

During the last few years we have seen our list of anesthetics constantly added to. We have tried the ethyl chlorid spray, cataphoresis, high pressure, and analgesia and found each possessing its peculiar virtues. We also have seen that cocain injected in the promiscuous and haphazard manner which characterized its use, was something to be avoided, but each and all has served a great purpose and added to the general fund of experience and knowledge. As a rule, however, the members of the profession plodded along, in the old way, making no concerted effort to lighten the burden of either the patient or himself.

We are all more or less familiar with the latest anesthetic method presented to the dental profession. Namely, conductive anesthesia, induced by the agency of novocain and adrenalin. In presenting this method to you today I am not claiming it to be a panacea. But judging from the enthusiasm with which the profession is accepting it I feel safe in saying that it is the most popular form of anesthesia ever attempted, and this for the reason that results have been most satisfactory and free from secondary effects. It is to be hoped that this enthusiasm will not blind the profession to the virtue of our other anesthetics which have done such excellent work for us. A most interesting volume could be written upon the subject of "Selection of the Anesthetic."

All surgeons recognize the fact that no single anesthetic or anesthetic method would suffice for all cases. Good practice would indicate the selection of the agent or method best indicated for any given case. For instance, in some cases in order that shock as well as pain be eliminated it is necessary that both local and general anesthesia be employed. Nitrous oxid and oxygen analgesia and anesthesia always will have an important place in dental practice, in the first place because there frequently will present cases where nothing short of general anesthesia will permit of the accomplishment of satisfactory results, and secondly because where a combination of anesthetics is necessary this agent is far more desirable than any other general anesthetic agent for this purpose.

We may all feel grateful that a satisfactory substitute for cocain has been discovered, for while this drug has proven a great blessing in some directions it has possessed so many drawbacks that it was constantly being regarded with increasing fear. As an anesthetic agent in dentistry it left a great deal to be desired. In the first place the method in which it was used was almost certain to result in failure while the known toxic effect of the drug always introduced an element of danger into the case.

In the search for a substitute for cocain, Professor Braun stated the following four characteristics which should mark any substance that would be acceptable:

First: It must be less toxic than cocain.

Second: It must be freely soluble in water and solutions must remain stable, not changing by boiling or long standing.

Third: It should not irritate tissues into which it may be injected, should be readily absorbed and should cause no after effects as hyperemia, inflammation or necrosis.

Fourth: It should be compatible with suprarenin.

In novocain we have a substance which embodies all these characteristics. It is claimed to be seven or eight times less toxic than cocain. It does not affect either the respiration or circulation. It may be boiled without changing and solutions will stand unchanged in loosely stoppered bottles for days. It is non-irritating to the most delicate tissues. Novocain powder may be applied to such delicate tissues as the cornea without causing any irritation. Its anesthetic effect is enhanced by the proper addition of suprarenin.

Suprarenin is a synthetically prepared substitute for adrenalin. Superiority is claimed for it over the product of the natural organ in that it overcomes, to a greater extent, the difficulty of preserving it.

Adrenalin is a powerful vaso-constrictor and is the most powerful chemical substance known. It is distinctly active when diluted even to 1–100000. Its toxicity is high and not more than 0.5 m.g. should be injected in a single dose. This toxicity is manifested by difficult respiration, palpitation of the heart, dizziness, fainting and oppression.

Suprarenin itself has no anesthetic properties. Its purpose in the solution is to act as a vehicle; it contracts the small blood vessels in the area into which it is injected and prolongs the effect of the anesthetic drug due to delayed absorption.

NORMAL SALINE SOLUTION

In order that the best possible results shall be obtained, it is necessary that the solution in which the anesthetic is contained should be isotonic, and either a normal saline or Ringer's solution is employed for the purpose. The former consists of a 0.6% sodium chlorid in distilled water. The latter contains in addition to Na Cl a slight trace of KCl and $CaCl_2$. These solutions conform more nearly than any other to the alkalinity of the blood, and with them the most perfect results have been obtained. Solutions varying from these either cause dehydration or tumefaction of the tissue cells into which they come in contact according to the extent of their concentration or dilution of sodium chlorid. These results are followed by soreness and sloughing. Pure distilled water formerly was used for the preparation of anesthetic solutions, but this is no longer considered good practice.

The successful practice of this branch of anesthesia depends upon several conditions each of which must be considered with the strictest adherence.

They are as follows:

First: A knowledge of the anatomy of the region under consideration, including a thorough knowledge of the nerve supply, the condition of the bones in various locations, as well as the several bony landmarks which serve for guides.

Second: The most complete asepsis governing the anesthetic solution, the instruments, the field of operation and the operator.

Third: The preparation of the solution and the carrying out of injections according to prescribed technic.

The principal contraindication for this form of anesthesia is an already existing infection in the field of operation. An injection under no circumstances should be made into pathologic tissue, for fear of spreading the infection. However, the injection can be made at a point remote from the infection, and, reaching the main nerve, may be considered under these circumstances not only as an anesthetic but as a curative procedure. It is a recognized fact that inflammatory conditions are not only controlled but subdued by the existence of local anesthetic condition in the affected area.

If proper thought is given to this work and the technic is followed out correctly .the desired results are just about certain to follow. Anesthesia will result in a short time, will endure, and then gradually disappear, leaving the tissues in an absolutely normal condition. If anesthesia does not result, the cause may be considered as due to either faulty technic or insufficient anesthetic solution.

If muscular stiffness is complained of the next day following injection, it may be considered that through faulty technic the muscles were infiltrated. This is a condition which should be guarded against, for while absorption from connective tissue is fairly rapid, from the muscles it is rather slow. The solution should not be injected too hot as it causes pain at the time of injection and possible sloughing afterward. While this anesthetic is present it is not by itself the cause of any acceleration of the pulse, respiration or heart beat. If these conditions are noticed they may be attributed to the action of the adrenalin in the solution or more likely to psychic disturbance.

The maximum dose of novocain is considered as 0.5 grams, a sufficient amount to make 24 c.c. or twelve syringes of a 2% solution an amount far greater than will prove necessary in any dental case. In surgery as much as 250 c.c. of a $\frac{5}{10}$% solution often is used without any cause for alarm.

In dentistry local anesthesia is considered as being divided into two parts according to the manner in which it is injected, and known as infiltration or submucous anesthesia, and conductive anesthesia. The technic for infiltration is very simple. It is employed usually to produce anesthesia of short duration in a small area as in one or two teeth. Its employment is possible only where the tissues surrounding the tooth to be anesthetized is perfectly healthy.

Conductive anesthesia is employed for the production of anesthesia in certain parts by the introduction of the anesthetic solution into the nerve trunk at a point remote from the field of operation, thereby temporarily paralyzing its powers of conducting nerve impulses. It is indicated where a large area is to be anesthetized or anesthesia for a long time is desirable. It is also desirable where the tissue in the operating field is infected prohibiting injection at that point.

The man who perfects himself in this technic with the intention of using it only in extracting is wasting his time. I believe that extracting, wherever possible, should be performed under a general anesthetic, for there is no other operation which we are called upon to perform which is so often attended by psychic as well as surgical shock.

It is in the operative field where the dentist will realize his chief advantage. There is no dental operation which is likely to cause pain but which may be performed to better advantage with than without the aid of conductive anesthesia. Cavity preparations for inlays and fillings, preparation of teeth for jacket or other forms of crowns, removal of pulps, opening of abscessed teeth, removal of pulp stones or calcified pulps, treatment of pyorrhea in such cases as an anesthetic is required, removal and treatment of pericemental abscesses, resection of a root apex, for fitting bands, for setting or cementing crowns and bridges. It may also be employed with the most happy results as a diagnostic measure in searching for the cause of neuralgia, antrum troubles, etc.

Rose Bld'g.

EASY WAY TO MAKE A SANITARY BRIDGE.*

BY F. H. WITTENBROOK, D.D.S., LIMA, OHIO.

THE TEETH TO BE CROWNED are prepared and crowns are constructed as for any other bridge, but do not polish them. I think they hold better in the impression when they are not polished. The impression material used is the Detroit modeling compound. I find it not as dirty as plaster and gives better results for taking bites and impressions. Crowns are placed on the roots of the teeth; see that they are in the proper position and ready to proceed to take the impression. The preparation of modeling compound should be according to instructions given by the manufacturer. Before taking the bite tell the patient that when you have placed the modeling compound in the mouth and the teeth have been closed, not to move the teeth until instructed. Instruct the patient to press the modeling compound to the lower teeth without moving the jaws. The reason I instruct them to push it to the lower teeth is, as a rule, they will always get more to the upper teeth than to the lower.

Now chill your modeling compound, using ice water. Having it chilled, have the patient open the mouth so that you will not distort the bite in removing it. Having removed the bite from the mouth I chill it again in ice water. If crowns have come off with the bite remove them and place them on the roots of the teeth for the impression. See that your crowns are in the proper position on the teeth, and that the occlusion is normal before taking the impression, for we all know that to get a good piece of work of any description we must have a good impression. I use the Detroit modeling compound for the impression, the same as for the bite, using the universal impression tray for holding the model crown in place while taking the impression. Now have impression tray cold so that the modeling compound will not stick to it. Press the modeling compound to the abutments and do not move until thoroughly hard by chilling with ice water. If crowns do not come away with the impression, remove them from the roots of the teeth and place them in their proper position.

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*Clinic Ohio State Dental Society, Columbus, Ohio, December 1915.

The next step is the running up of the impressions. Whenever I am going to heat an investiment I always put an old bur in the investment parallel with the bridge to be soldered, to strengthen the investment. For this model I use an investment material which is my own make of equal parts of fine sifted coal ashes and plaster, so that the soldering may be done right on the model. You will find this is a very quick-setting investment.

Now run up both sides of the bite with plaster and place the same on the occluding frame with the same mix of plaster. When set, separate by placing in warm water to soften modeling compound so as to remove it from model. The model which is made with investment material will have the abutment of bridge while the model on the occluding frame will have the reproduction of the abutment in plaster.

Now to construct the bridge between abutments, use occlusal surface that will fit the case best at hand. Fit occlusal surface for bridge on the occluding frame. To fill space between the alveolar ridge and the gingival surface, use a soft piece of wax, (the wax used is that on which we buy plate teeth), to support the occlusal surface while fitting them to place. Now being properly fitted flow solder on the gingival of bridge teeth to strengthen it, and place model with the crown in water for two minutes.

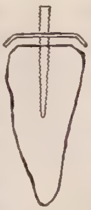
To fill the space between the abutment for soldering the bridge together, use fiber asbestos and plaster. The asbestos is mixed with what plaster will hold to it. Wet asbestos and plaster and place between crown on model, place the occlusal surface of bridge teeth on the asbestos, and by using the relation between model on the occluding frame the one in investment material of the upper teeth may be placed in the same relation as the lower on the occluding frame. Holding the same to place we can adjust the occlusal surface to the upper teeth, by placing the asbestos and plaster to retain it.

Now we are ready for soldering which will only be upon the occlusal surfaces to assemble the bridge together. Remove the assembled bridge from model and clean and place soft wax on the surface of the bridge where the solder is to flow. Invest in same material as before, having set up the wax can be removed without boiling if properly placed. For this soldering any old gold may be used that you may have with your solder, to give the bridge the proper contour. Soldering completed remove from investment material, clean and polish as any other bridge.

TECHNIC OF MAKING A PERFECT JOINT BETWEEN THE ROOT END AND PORCELAIN IN CROWNING*

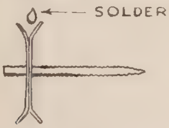
BY LELAND E. PHELPS, D.D.S., TOLEDO, OHIO.

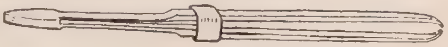
The technic of making a perfect joint between the root end and porcelain when adjusting any of the detached post crowns, is as follows:



After the ordinary preparation of root, slightly beneath the gum margin, beveling edge select a copper shell which will just slip over the end, filling the shell flush full with modeling compound. Warm exposed compound over alcohol lamp and press over root, chill and remove impression. Oil the surface with three-in-one oil, wrap paper around shell forming a cup into which pour Barnes' model quick. Swage thirty-six gauge pure gold over model obtained, in a Modline Swager, giving a perfect coping.

Place on root and press in place, with sticky wax; remove and invest in Neutralite and solder immediately. Replace on root and adjust porcelain to *near fit*; remove and swage thirty-six gauge pure, to root end of porcelain; replace and withdraw porcelain, afterward, the copings, with pin waxed slightly together, holding same in orthodontia pliers; flow solder around and join two parts together, using very fine flame.





The object of this clinic was to show the accuracy of adjustment which may be obtained and the speed with which it may be accomplished, using the material mentioned, the whole operation being easily done in less than one hour.

* Clinic Ohio State Dental Society, December, 1915

GOLD BASE FOR A PORCELAIN CROWN*

BY E. J. FROWINE, D.D.S., BOWLING GREEN, OHIO.

First: Prepare root of tooth in usual manner as for plain porcelain crown. *Second:* Grind tooth to fit root approximately. *Third:* Use fissure bur and cut slot in root on lingual and buccal side, extending slot about one-half of root surface mesially and distally. *Fourth:* Burnish coping over root, using 36 gauge pure gold plate, puncture coping and fit pin and tooth to root at the same time, remove and solder coping and pin with very small piece of 16 Karat solder, replace coping and burnish again; cover coping with inlay wax and press crown to place, seeing that crown is in the exact position you want when finished, remove crown, and cast base in usual manner.

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*Clinic Ohio State Dental Society, 1915.

NEW METHOD OF CONSTRUCTING FULL DENTURE

BY W. CLYDE DAVIS, B.S., M.D., D.D.S., LINCOLN, NEBRASKA

I HAVE A METHOD, which I wish to give the dental profession for its consideration, of constructing a full denture, either single or double, that I have never read of, and I believe the idea or the application of the idea is original. I have tried it out in our infirmary and proven that it is possible to get suction for all plates both upper and lower in every instance where the mouth approaches normal.

Stated in a nut shell the method involves the complete abandonment of the model of the mouth, and the plate is vulcanized on a cast which is the negative of an adhering base plate. Stated as briefly as possible the method is as follows: An impression is taken of the mouth and the cast made, which should be somewhere near correct, but it is not necessary to take any great pains with it. It should give the outline of the completed plate and partially represent the conditions of the mouth. In some instances even this is not necessary provided you have a dummy cast of plaster, metal or celluloid which is somewhere near the size of the mouth, but should be a trifle larger in every direction. Having secured an approximately correct model a specially prepared base plate which is very thin and when warm is very pliable, is readily shaped over this model. This base plate will probably not show suction when placed in the mouth and pressed to position. If it is far wrong, take it out, warm it over a flame and press to place in the mouth. As soon as a little suction begins to show up, instruct the patient to keep the mouth closed and suck the plate as tightly as possible. The warmth of the mouth will change this until close adaption results and strong suction will appear. This may be assisted by manipulating with the fingers and is particularly necessary with the trial base plate on the lower jaw. When the suction has been secured it will be found that this trial plate will not fit the original cast even though it is a perfect model of the mouth. It will be found that no impression of the mouth can be taken which this adhering base plate will fit, which proves my contention for the past twenty years, that a plate made from a perfect cast of the mouth seldom has adhesion. I always have spoiled my casts up to this time in order to get adhesion. Now I am asking you to throw them away altogether.

Coming back to the case where you have one or both adhering trial base plates in the mouth: I then take the bite in the usual way for that kind of a case, using the built-up bite on these base plates. Plaster of Paris is then mixed up ready for use and the trial plates hastily removed from the mouth and filled with plaster. These are then mounted on the articulator and the case proceeds in the usual way. In these casts which are poured up you have the negative of an adhering base plate which is by no means a model of the mouth. Every plate made by this method both upper and lower adheres as did the trial base plates.

This method of making an adhering denture without vulcanizing on a cast of the mouth has many side issues which I haven't time to go into at present. Suffice it to say that by this method we can construct a denture, if necessary, without having taken an impression of the mouth, using an approximate dummy to start the shape of the base plate, completing its form in the mouth, assisted by the body temperature which must slightly affect the specially prepared base plate. The plates should be a little below body temperature in order that they may not give and change shape under the weight of the poured-in model. The base plates should be given a thin coat of quickly drying ether varnish before pouring the plaster and then painted over with a very thin solution of soap. This gives a smooth cast and the base plate by warming can be easily removed from the cast. This matter can be tested out by any one. If they will try the base plate back in the mouth after it has been removed from this cast it will be found that the adhesion is still there. If you will take the base plate and warm it and place it over the original cast of the mouth and press it into place, then try it in the mouth, it will be found that the adhesion has been destroyed. Allow this base plate to remain in the mouth and get warm and adhesion again takes place. Taking it out of the mouth it will be found to fit the cast which has been poured into the base plate and does not fit the cast of the mouth.

You will see more about this method later on.

THE MORE PRACTICAL USES OF ANESTHETICS IN GENERAL PRACTICE*

BY C. H. CLARK, D.D.S., YOUNGSTOWN, OHIO

SURELY THIS SUBJECT deserves the deepest consideration. Few of our patients present themselves for dental work but will have something to be done where there will be need for the use of some agent to relieve the pain accompanying such operation. The agents which we have and which can be used to great advantage are nitrous oxid, somnoform, cocain, novocain, and others of lesser importance. I often wonder why these agents or materials are not used more.

In many offices you will not find such things as nitrous oxid or somnoform apparatus, a hypodermic or high pressure syringe. Why?

Is it the lack of knowledge to use or handle such apparatus and materials; fear of the unpleasant results attendant upon such use, expense of apparatus or what?

With the available literature, instructions which accompany all apparatus able men in different localities ready to give such instructions and impart such knowledge, how can such excuse be justified?

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*Read before the Ohio State Dental Society, Columbus, Ohio, December, 1915.

Fear of unpleasant results may be the more discouraging. Allow me to say here that I cannot appreciate where there can be any danger in the use of nitrous oxid or somnoform used for the analgesic stage, as this is the stage we will find use for most in our general practice. After using in this form until becoming familiar with these agents, materials and apparatus, and realizing how comparatively safe such use is, I feel that the practitioner will be using them for the complete anesthetic stage.

EXPENSE OF APPARATUS

Where this is the consideration I would advise the purchase of one of the simply constructed nitrous oxid-oxygen machines, probably an old or second-hand one, and with the use of a comparatively large cylinder, say not smaller than the 250-gallon size or regulator, which will enable you to obtain a steady flow of gas.

The expense of a hypodermic or high pressure syringe can hardly be much of a consideration, and this is true of the somnoform outfit. Many of you may doubt the success attending the use of nitrous oxid or somnoform, for analgesia. I wish I were able to discourage this. Most or all of you have witnessed clinics where this use was attempted and I have yet to see such a clinic that could be called successful. This is not because it is impossible, but because there is no more difficult place to attempt such a demonstration than a convention hall with its discouraging environment. All people are susceptible to the effects of anesthetics, more or less, all must pass through the analgesic stage before reaching the anesthetic stage. Hence the possibility of analgesia. The technic is simple.

Have your patients inhale enough of the agent until reaching the analgesic stage, a condition of numbness, yet consciousness, where they will not feel the sharp pain experienced otherwise. With a little experience you will appreciate this condition.

Don't be discouraged by a little obstacle in the way of disappointment. What is there that you might attempt where such obstacles are not to be overcome, if the project is worth while?

Though nitrous oxid and oxygen have more advocates I feel that somnoform can be used in the same way and with the same degree of safety. I use both frequently but prefer the nitrous oxid on account of convenience of the inhaler. In such operations as cutting a sensitive cavity, exposing pulp where same is to be removed with novocain or cocain, drilling into tooth having pericemental trouble, or for any operation producing similar pain.

The high pressure method can be used successfully for such things as anesthetizing dentin or pulp for cavity preparation or pulp removal.

The combination of novocain and suprarenin is a wonderful combination. It can be used with very pleasing results in the conductive, infiltration and other methods, for minor operations, extractions, root amputations, gum lancing, pulp removal, removal of hypertrophied tissue, without the toxic effects of depression and sometimes collapse met with occasionally in the use of cocain.

I notice the chief objection to this combination for extraction is that a dry socket results, meaning that we do not have enough bleeding to fill the socket, and result in clot formation and immediate repair. I have watched for this dry socket condition and find that it results just as often where a general anesthetic is used, and I probably use the general anesthetic for extraction more frequently than the local. I feel that the dry socket condition is due more to the condition of the peridental membrane than the suprarenin.

Cocain I seldom use because novocain has all of its good qualities and few of those which are so depressing.

I have all of these agents at my disposal and find use for one or the other quite often. I know there are those who are partial to some certain anesthetic and who will therefore criticise the use of the others. I would not consider this criticism justified, broadness being more conductive to progress, and progress can only result when there has been investigation and use.

You have heard and read long discourses upon this subject, containing much that has been encouraging and much that was discouraging. I trust that I have given something that will encourage the more general use of these materials.

DISEASES OF THE ANTRUM*

BY WALLACE C. DYER, M.D., EVANSVILLE, IND.

THE MAXILLARY ANTRUM is common ground for the Dental Surgeon and the Rhinologist. Probably half of the pathological conditions arising in the antrum have dental lesions as their chief etiological factor, and too much importance cannot be attached to the teeth as causative agents in antral diseases. Hence a thorough knowledge of the teeth and their relation to the antrum is an essential to the well equipped nasal surgeon, while, on the other hand, the dentist should keep himself thoroughly acquainted with the pathology of processes which may be going on in the cavity in proximity to the teeth upon which he may be engaged.

The antrum is subject to acute and chronic inflammatory changes in its lining mucosa: necrosis of its walls, cysts and tumors, the latter being both benign and malignant. The inflammatory changes are acute and chronic catarrhal, and acute and chronic purulent; and as a rule there are extensions from some part of the nasal cavity or neighboring accessory sinuses, including those which are due to the infectious diseases as influenza, diphtheria, tuberculosis and syphilis. Carious teeth protruding into the lumen of the antrum and infections following dental procedures are frequent sources of disease of the antrum. Invasion of the bony walls of the antrum are most commonly due to traumatism or tumors. We will devote our time today to a consideration of the catarrhal and suppurative conditions for obvious reasons.

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*Read before the First Indiana District Dental Society, 1915.

Acute catarrhal inflammations may, and probably most often do arise with an acute rhinitis. Temporary closure of the ostium maxillare is a probable cause, and spread of inflammatory phenomena by contiguity of tissue from the alveolar or adjacent structures is not unlikely to take place. Ethmoiditis, frontal sinusitis, the entrance of foreign material in the form of powder insufflations or the nasal douche, traumatism along with nasal symptoms accompanying the acute infectious diseases or distant lesions in the heart or kidneys, are all given as causative agents in this form. Still other cases may be attributed to animate and inanimate foreign bodies, and in this latter class must be placed tumors and the teeth. Some writers associate systemic poisoning from drugs or metals as lead, arsenic and mercury with the acute catarrhal form of antral diseases.

The tendency is to a spontaneous cure when the exciting cause is removed. One or both sides may be implicated. The symptoms peculiar to the conditions are not marked, consisting chiefly of a deep-seated pain in the upper jaw and with pain in the teeth deriving their nerve supply from branches which traverse the inflamed antral space. As a rule the diagnosis is not difficult, usually tenderness on tapping the teeth is elicited and there is some edema of the nasal mucous membrane on the antral side.

Chronic catarrhal inflammation may follow repeated attacks of the acute form or it may result from the prolongation of an acute attack through the persistance of its exciting cause, though most often suppuration ensues from the foregoing condition. Continuation of the chronic non-infected inflammation often leads to the closing of the ostium, and through the steady accumulation of the mucoserous discharge, the establishment of what is termed hydrops antri, or through the formation of myomatous masses the antrum may become filled with a semi-solid translucent material constituting a mucocele.

In general the symptoms of this form of disease are similar to a chronic suppuration of the antrum without the systemic and local manifestations of confined pus or the intermittent discharge of purulent material into the patient's nose. The sufferer experiences a sense of uneasiness on the affected side which is distinctly relieved when there is a discharge into his nose of a glairy, mucoserous material, and usually the discharge may be seen under the middle turbinal when, if the excess be wiped away, and the head inclined toward the unaffected side a new supply will generally appear. Severe symptoms will supervene if the escape of the secretion is prevented, distension of the antrum occurs, the thin walls allowing the swelling to become apparent in all directions. The eyes may be congested and protruded, the cheeks swollen, the teeth sore, and the patient will declare they seem too long when he attempts to masticate; the palate may be bulged and the greatest discomfort ensues.

The simple chronic inflammation without infection is not common. However when it does exist it should be treated by establishing free drainage either through the nose or by opening through the canine fossa. In the acute catarrhal inflammations, treatment of a medicinal nature is often of benefit, though drainage through the nose is usually the most certain means of relief.

Empyema of the antrum is as a rule preceded by a catarrhal inflammation, the secretions of the latter condition becoming purulent with the access of micro organisms. The catarrhal processes seen in the infectious diseases are especially liable to become purulent. In the patient suffering from this form of antrum disease a careful search will usually elicit some general impairment of the economy, such as tuberculosis. The source of the infection may be from a simple rhinitis, the discharge from a purulent frontal or ethmoid inflammation by way of the ostium, from a penetrating injury, and a large proportion of cases is traceable to suppurations at the roots of the upper teeth or adjacent tissues in relation to the antrum. Some investigators declare the teeth to be the causative factor in seventy per cent. of the cases of empyema of the antrum. The use of arsenic to devitalize a tooth has been ascribed as a cause, and a case is recorded where extensive necrosis and suppuration followed the injection of zinc chlorid into a tooth cavity connected with the antrum. The symptoms of antrum empyema may be those of a mild systemic infection, chill, headache, sweats and if the discharge be swallowed there are gastric disturbances. The pain is as a rule not severe as the outlet of the purulent material is not greatly interfered with. This discharge may be constant or intermittent, usually yellowish and may be blood streaked; and the patient may notice that he is able to bring it on by inclining his head obliquely downward and forward. Tenderness over the antrum can as a rule be made out, the teeth are tender and if there be a fistulous opening through the socket of an extracted tooth a drop of pus may be found at its opening.

The chronic form in many cases is a continuation of the acute, and causative factors are largely the same. Likewise the symptoms are for the most part similar, save the patient is more depressed due to the impairment of his general health, and his belief that he is repugnant to his friends, for he fancies that they must be annoyed by the peculiar fetor of the discharge.

Confined suppuration of the antrum is a term applied to the progressive formation and accumulation of pus within the antrum and without vent. It may result from an acute process with the antrum orifice occluded or shortly followed by occlusion in inflammatory phenomena. It may be originated in a similar manner during the existence of a chronic suppuration and in the third place may result from the infection of the hydrops antri already referred to.

The occlusion may be congenital, may follow the turgescence of the nasal mucosa in an acute coryza, the enlargements of hyperplastic rhinitis may cause it or it may be due to polypoid growths within the antrum or nose, or to the presence of a diphtheretic membrane or other foreign body.

As a rule the development of this condition is insidious. The region of the antrum becomes tender especially to tapping the teeth, there is a sense of fullness and heaviness, the pain increases and is accompanied by a throbbing and beating almost unbearable. The teeth supplied by nerves passing through the antrum are intensely painful and teeth have been extracted under such conditions when the dentsit was astounded at the discharge of pus and the patient at the relief secured. The swelling, unless measures are adpoted to relieve the cause, may reach an almost unbelievable degree. The eyeball may protrude, vision is impaired, the lachrymal duct cannot drain and the lids are overflowed by lachrymal secretions. The nasal orifice on the affected side may be occluded, the hard palate is bulged out and a spontaneous rupture through it may occur. Mastication is impossible owing to the pain and all the signs of a general pus intoxication appear. Unless relief is given there is finally a rupture with probably the establishment of a greater or less fistula. The opening may occur through the palate, alveolar process of the superior maxillary into the orbital cavity, cheek or nostril; wherever it is there is a decline of the severe symptoms with, perhaps, the establishing of a chronic suppurative inflammation.

The diagnosis of suppurative conditions of the antrum rests upon the physical signs and symptoms, aided by transillumination which must be properly done and which has its limitations, and skiagraphs. It is not my purpose here to discuss the methods of arriving at a diagnosis or to enter upon a discussion of the various forms of treatment. For the latter many plans have been devised but no fixed procedure can be adapted to every case. If the infection of the antrum and cause of the suppuration is of nasal origin the treatment should be through the nasal cavity. If it is associated with dental caries the treatment should be from below through the alveolar process. Skillem of Philadelphia has recently published a new method of entering the antrum through the nose, which, in brief, consists of elevating the soft tissues in front of the inferior turbinate and then chiseling, or by means of electrically driven burs, opening into the antrum. By this means a free drainage is established and the cavity is subjected to occular examination. The use of negative air pressure also has its place in certain cases. For the immediate relief afforded by the older method of breaking through antral wall under the inferior turbinal the patient is always grateful and in most cases this method will yield splendid results.

Of especial interest to the dentist is the rather rare condition of emphysema of the antrum. The generation of gases from a decayed tooth is the chief etiological factor in this form of disease. If the ostium is not closed the odor is apt to lead to a mistaken diagnosis of a nasal lesion with ozena; if it is closed the patient will suffer pain from the pressure, headache and eye disturbances. The diagnosis is difficult and is generally made by exclusion and because lesions of the teeth draw attention to the real conditions.

Foreign bodies in the antrum may be inanimate or animate, the former being instruments of various kinds, pledgets of cotton lost in treatments, bullets or others resulting from traumatism. Various means must be adopted for their removal, success depending upon the ingenuity and dexterity of the operator. Living foreign bodies are rare but cases are on record where insects and worms have found their way into the antrum by way of the ostium and caused serious trouble. The only way of removing them is to open into the cavity by one of the approved methods.

The antrum is of course subject to the inroads of syphilis, tuberculosis, glanders and octinomycosis, and though rare when they do occur are concomitant with similar lesions elsewhere in the nose. Tumors of the antrum are not common, but of the benign growths osteoma and myxoma are the most common. Sarcoma and carcinoma may be either primary or secondary.

DISCUSSION

Dr. H. B. Tileston, Louisville, Ky.: Doctor Dyer has presented a very interesting paper on the diseases of the maxillary sinus, commonly known as the Antrum of Highmore, and as a matter of information it is valuable to the dental practitioner. I do not agree however, with the statement which he makes at the beginning of his paper, that "the antrum is common ground for the dental surgeon and the rhinologist."

This impression probably arose from the custom in former times, not so very remote, of the dentist being called upon frequently by the rhinologist to extract a tooth and to make an opening through its socket into the floor of the antrum for the purpose of drainage and treatment. As these openings had a marked tendency to promptly close up, a tube of vulcanized rubber or of metal was inserted and a stopper or plug provided for the tube, to keep the oral secretions and food particles from passing through it. Altogether a most abominable contrivance.

Having done this much, which at least relieved the sufferer by evacuating the antrum, if engorged, the case was often left in the hands of the dentist for treatment, especially if an old chronic one that the rhinologist was glad to be rid of, and thus the dentist had many of these cases wished on him.

The antrum has no direct communication whatever with the mouth, whereas it does communicate directly with the nasal cavity, whence many of the affections of the antrum originate.

The method of treating diseases of the antrum through a tube entering the sinus through the socket of a tooth, is fortunately obsolete. A much better way to gain entrance, both for drainage and treatment, easier and more direct, and not involving the loss of a perfectly sound tooth as often happened, is by the method referred to by Dr. Dyer, towit: the operation advocated by Skillem of entering by way of the nose just in front of the inferior turbinated bone.

This method of entering the antrum has, as I understand, superceded all others, and hence the treatment of these cases falls very naturally to the rhinologist.

The only circumstance in which the dental surgeon should become involved in a case of antrum trouble, would be where a tooth with a putrescent pulp was the evident exciting cause and required to be extracted. In which case the socket of the extracted tooth should be allowed to heal up as usual and an opening be made through the nose by the Skillem operation, for further treatment if necessary. It might be that the extraction of the tooth, eliminating the cause, would effect a cure, in which event I presume the dentist should be given the credit.

I am not inclined either, to accept the statement that "half of the pathological conditions arising in the antrum have dental lesions as their chief etiological factor," nor that "the teeth are the causative factors in seventy per cent. (70%) of the cases of empyema of the antrum."

Dr. Dyer himself mentions at least a dozen contiguous or systemic pathological conditions, other than those associated with the teeth, that have been observed to be causes of diseased antra. It is not reasonable to suppose that the teeth are the causative factors in more cases than all other causes combined.

It would appear that the antrum is much more liable to become involved from inflammatory and infectious lesions in the intercommunicating sinuses or in the nose itself, than from the teeth.

In proportion to the number of teeth in the superior maxillary situate beneath the floor of the antrum, very few penetrate into that cavity with their roots, and compared to the number of bicuspids and molars in that region which abscess from putrescent pulps, very few indeed infect the antrum. As the upright position is maintained by mankind for at least two thirds of the time, gravity tends to cause the pus from an alveolar abscess to burrow downwards, and if a fistula forms it invariably appears at a point *below* the apex of the root. In chronic cases of alveolar abscess of long standing the bony structure about the root may become necrosed and involve the floor of the antrum.

I am of the opinion that most of the cases of diseased antrum traceable to the teeth are caused by direct infection of the lining membrane of the antrum by putrescent matter from roots which penetrate its floor, rather than by the voiding of pus from an alveolar abscess into that cavity.

The idea that teeth were the frequent cause of inflammation of the antrum and that empyema was usually traceable to an abscessed tooth arose probably, as mentioned before, from the custom so long maintained, of extracting a tooth to gain a ready entrance to the antral cavity. The tooth selected might or might not be defective. Naturally the choice would fall to a tooth badly broken down by caries or to one having a dead pulp or an abscess. Occasionally the removal of the tooth was followed by a copious flow of pus, showing that the root penetrated the floor of the antrum but not proving that the tooth was the cause of the empyema. More often it was necessary, after the extraction of the tooth, to drill through the bone for some distance with a large bur, before the floor was penetrated.

Since the abandonment of this mode of practice the dental surgeon rarely becomes involved in the treatment of antrum troubles.

The dentist, however, should be perfectly familiar with the symptoms accompanying diseased conditions of the antrum in order that he may readily recognize them and refer them to the rhinologist for treatment.

If the affection is evidently of dental origin he should be prepared to cooperate with the rhinologist to whatever extent the particular conditions may demand.

ANALGESIA*

BY W. N. MORGAN, D.D.S., COLUMBUS, OHIO

I WILL FIRST GIVE YOU MY METHOD of producing analgesia. I will then give you the method used by some of our best specialists.

There are three stages in giving N_2O+O.

First, analgesia in which the most sensitive cavities can be prepared for filling absolutely without pain.

Second, the excitement in which nothing can be done.

Third, anesthetic in which major operations can be performed, such as extracting teeth or removing large nerves.

Analgesia is a stage in which a patient is insensible to pain, but still conscious. Suggestion plays an important part in analgesia.

My method of procedure is as follows:

I first adjust the chair to a proper position. Never tip the chair back as this causes the patient great inconvenience in expectorating, but adjust the back of chair. Adjust head rest so the patient's head will drop forward just a little. This is done so the patient will not be swallowing mucus or the saliva, as this often produces nausea. After fitting the nose inhaler tight, say to the patient: "I want you to relax, make yourself comfortable and I will do your dental work without pain to you. Now I want you to keep your eyes open so you will know what is going on. You are now taking the anesthetic and there is positively no danger from it. You can take it as freely as air. If you feel yourself going to sleep, breathe through your mouth; if you feel any pain, breathe through your nose. I want you to take this yourself." I then start to give the patient about 10% O, 90% N_2O.

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*Clinic Ohio State Dental Society, 1915

When the analgesia stage is reached, I then open the air valve and give the patient about 25% O. 75% N_2O, and with the air valve open the patient is getting about 33% O. I do not use a re-breathing bag, but use warm gas. You should always be prepared for any bad effects. I keep on hand Greeley's hypodermic unit, camphor in oil, two grs. You will see by these units how nice they are. I believe camphor in oil is one of the best heart stimulants and is now used by the best anesthetists. And, by the way, those of you who are using emetine in treatment of pyorrhea, will find emetine hydro, put up by Greeley in the unit form, very convenient. In these forms you have everything perfectly sterile and ready for immediate use.

I will now give you the method used by other prominent specialists.

Dr. Chas. K. Teter, of Cleveland, says he uses about 20% N_2O, 5 % oxygen and 80% atmospheric air. He uses the gas heated. He uses no special re-breathing bag. He uses strychnine or pure oxygen for a heart stimulant.

Dr. J. P. Henahan, of Cleveland, says: "In analgesia I use the smallest amount of N_2O which I can allow to flow into the bag. I use no oxygen in any but special cases such as very anemic patients and these are very few. Instead of oxygen I use air by having the air-vents on a Teter nasal inhaler wide open. As analgesia progresses it has a tendency to grow deeper. If I need to use oxygen I do not employ it by any given rate but according to the requirements of different patients. I judge this according to the color."

Usually the amount of N_2O employed in analgesia cases would be about ten gallons per hour.

When oxygen is employed it is usually necessary to employ rather generous quantities.

Dr. Henahan further says:

"Yes, I employ warm gas always. It reduces irritation to the minimum and makes the gas more efficient. I do not employ a special re-breathing bag but a small proportion of the gas is re-breathed; this is so because the air-ways are open wide and enough concentration does not take place to force more than part of the gas back as far as the bags."

He also says: "Camphor as a stimulant is becoming very popular and is very efficient. I have employed it by the stomach, about ten drops of a 10% solution in water."

Dr. E. I. McKesson, of Toledo, says:

"I use 93% nitrous oxid with 7% oxygen in analgesia, as the basic mixture, which, of course without the addition of air would anesthetize practically every patient although in some there would be an insufficient proportion of oxygen. This basic mixture is then diluted with enough air to produce the degree of analgesia desired, varying the degree to meet the needs of the operative work for the moment.

I have discontinued the use of a heater as unnecessary, and use the gases from large or small tanks, which by experiment are found to reach the patient, without heating, at room temperature.

I use re-breathing by the fractional method in practically all cases; it stimulates the shallow breather to take normal inhalations, thus securing a smooth analgesia without increasing the actual gas consumption. In the rapid or deep breather it prevents over ventilation and the shock which is caused by it.

I believe camphorated oil is one of the best cardiac stimulants, used hypodermically, but I have not found occasion to resort to any heart stimulants in either analgesia or anesthesia, for two or three years."

You now have the different methods to produce analgesia—try them out, see which you like the best.

ANTICIPATING REMOVAL OF FIXED BRIDGES WITH DOWEL ABUTMENTS*

BY C. E. YOUNG, D.D.S., CINCINNATI, OHIO

In removing the cemented dowel crown from its position on the root of the tooth, whether used separately or as an abutment in fixed bridgework, the most difficult part of the procedure is in displacing the dowel from the root canal. Anticipating such an event, a detachable porcelain crown, such as the Goslee or Davis, and a loose dowel are used.

If it is the intention to remove the work for extension, the shoulder of the dowel is ground off. If a fracture only is forecasted a part of the shoulder may be left on the dowel. It is a good plan to leave a trace of the shoulder on the dowel of the terminal abutment as an aid in cementing the bridge to place.

Any form of abutment, soldered or cast, except that having the full peripheral band, may be used.

In event of necessity of removal of the work the porcelain of the abutment is ground and broken off, and the remainder of the shoulder of the dowel burred away. The cement around the dowel is then loosened and the abutment attachment pried off, leaving the dowel in its position in the root, undisturbed.

After repair or addition has been made the bridge is replaced and attached with a duplicate porcelain crown.

Attention is also called to the spacing of the bridge teeth so that the bridge may be cleaned thoroughly by using a tooth brush and dental floss.

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*Clinic Ohio State Dental Society, 1915.

AMALGAM RESTORATIONS*

BY J. H. LINSLEY, D.D.S., ASHTABULA, OHIO

Having found out by careful observation of hundreds of patients that there was no part of our dental practice more misused than amalgam fillings and the gold crown, I was led to study how I could help these conditions, and at the same time render good services to my patients. I believe the 50c and 75c fillings and the $3.00 and $5.00 gold crowns have been the biggest curses to humanity that the dental profession has been guilty of inflicting upon it.

Finding but few good amalgam fillings and fewer good gold crowns, leads me to improve if possible on this part of our operative work. But back of all of this poor work, I am sometimes impelled to believe that our dental colleges are to blame for the larger part of it. In college we are all anxious to do gold restorations, and the faculty think, or at least they teach as though they thought, any one could put in amalgam fillings and put on gold crowns.

I hope the time will come when amalgam restoration will occupy its rightful place in our college education. It took me five long years after graduation to learn some of the things that are necessary to do this kind of work as it should be done.

Now some of the requirements that I think are necessary to do this kind of work are:

First: A good alloy, and in my clinic I shall use Dr. Crandall's non-zinc alloy, and let it speak for itself.

Second: We should use some kind of an alloy and mercury measure to determine as nearly as possible the exact amount of these parts to use, and nearly all alloys tell you what parts to use.

Third: Proper cavity preparation. I shall give you no iron-clad rule to follow, but I would advise you to follow Dr. Black's rule for this part of the work, together with a good lot of common sense.

Fourth: Learn how to pack amalgam. Not one dentist in ten, I believe, knows how to do this. We all think we do, but you will be surprised to learn that you don't if you will do a little of it outside of the mouth where you can see your defects. I never learned how to do it until I began to do indirect gold inlay work from amalgam dies, and if you want to learn how I would advise any one to take up this work, and by it you will learn to pack amalgam, for if you have not properly packed it you will have a defective die and you cannot use it, and by learning how to eliminate these defects you will learn how to pack amalgam. Then another way is to use glass tubing, and pack into it, where you can see what you have done. In my clinic I shall show some of these packings in glass tubing. And they show us where we are weak in our technic, either in mixing or packing.

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*Clinic Ohio State Dental Society, 1915.

Fifth: A matrix should *always* be used whenever it is necessary to restore the occlusal enamel walls; first to keep the filling from being packed out under the gingiva, and causing irritation and later pyorrhea, and second to make it possible to properly condense the filling, restore contact and restore the marginal ridge.

By learning how to use these matrices we can nearly eliminate the gold crown from the molars and bicuspids. In my own practice I have put on only two gold crowns in the last year; that is, outside of bridge-work.

By using the band matrix and proper cavity preparation I believe we can restore nearly all of the badly broken-down molars and bicuspids. For the technic of many parts of my clinic I shall refer you to Dr. Crandall's paper in The Dental Summary for July and August 1915. As the Doctor has covered the work beautifully I see no reason why I should go over it again.

But the thing I wish to show is, what can be done with amalgam if we will only learn how to use it.

CAVITY PREPARATION FOR AMALGAM FILLINGS*

BY PERRY B. CLARK, D.D.S., COLUMBUS, OHIO

In this clinic I am showing two typical cavities which we encounter every day. The preparation shows that of Dr. Black's well known method of the step with "extension for prevention."

In the one case the step is cut only to the transverse ridge, which is sound and intact there being no grooves or sulci running through ridge. Because of the importance of this ridge in mastication, and because of its structure in this case, we do not cut through it even if the distal pit be involved, but taking care of the aforesaid distal pit entirely separate from the other cavity.

In the other case, the transverse ridge is found to be grooved and the distal pit is involved, so the step is extended through ridge into the distal pit following all grooves to their ends to prevent recurrence of caries at those points.

To obtain retention; an inverted cone bur of suitable size is placed on the floor of cavity, parallel to the long axis of tooth and pressed to the buccal, cutting in half the width of bur and drawing towards the occlusal surface, leaning bur towards center of cavity until it cuts out leaving a pillar- or column-shaped form of retention. The same form is obtained on lingual aspect of cavity.

The buccal and lingual margins are always extended out past contact with the proximating tooth to prevent recurrence of caries.

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*Clinic Ohio State Dental Society, 1915.

ORAL HYGIENE BULLETIN*

BY THE COMMITTEE ON PUBLIC DENTAL EDUCATION, ARIZONA STATE DENTAL SOCIETY

IN THIS ENLIGHTENED AGE it is the duty of professional men, such as dentists, doctors and educators to instruct people how to avoid illness and to maintain a healthy condition of the human body by proper exercise, diet and cleanliness. It has been rightly claimed that nine-tenths of all disease germs enter the body by way of the mouth, and so we should guard and protect this entrance against infection or contagion and keep it in a normal and healthy condition.

CLEANING BABY'S TEETH

When the baby's teeth first appear they should be cleaned daily with a clean soft muslin rag dipped in a 5% boric acid solution, which can be made by dissolving a teaspoonful of the acid in a cupful of hot water and boiling till the solution is affected. After the child has all the baby teeth (20 in number) erupted, a small child-size tooth brush and some good paste or powder should be used and the child trained up to regular habits of cleanliness, which once acquired will last through life. If this careful cleanliness is neglected the teeth will decay and the mouth will form a breeding ground for malignant germs, which may affect the whole system and reduce the child's vitality to such a degree that it will be backward in play or study and the body will be stunted in its growth.

EXAMINATION

This proves the importance of examining the children's teeth regularly every six months at least by a competent dentist, and having the cavities filled and discolorations removed.

IMPORTANCE OF SIXTH YEAR MOLAR

Between the ages of five and six years the first permanent molar appears behind the last baby tooth and is often mistaken for a baby's tooth and allowed to decay. It should receive special care as it forms the keystone of the whole arch and if lost will cause irregularities of the permanent set of teeth.

NOSE AND THROAT

The child's nose and throat should be examined by a physician and if adenoids are present they should be removed so that there will be no obstruction to breathing through the nose, the only natural and healthy way.

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*This pamphlet, issued by the Committee on Public Health Education of the Arizona State Dental Society, is intended for free distribution in connection with stereopticon lectures on "Oral Hygiene" and serves as a reminder to those attending the lectures. It is short, only about fourteen hundred words, and contains the essential points of the lecture issued by the National Mouth Hygiene Association. As there is no copyright on this pamphlet, it can be used by any society for free distribution.

FLETCHERIZATION

Children should be taught the value of eating food slowly and masticating every morsel thoroughly to a perfect liquid, when swallowing takes place unconsciously. This is called "Fletcherizing." It requires a smaller quantity of food to properly nourish the body than if food is bolted and washed down.

COARSE FOOD

Food should have the necessary degree of coarseness or grit to make it suitable for Fletcherization and all artificially prepared and pre-digested food should be avoided, as it forms a pasty mass around the teeth so difficult to clean and so ready to ferment and start decay.

TWO SETS OF TEETH

There are two sets of teeth in the human mouth, temporary and permanent teeth.

THE TEMPORARY TEETH ERUPT IN THE FOLLOWING ORDER

The four central incisors between the fifth and eighth months.
The four lateral incisors between the sixth and tenth months.
The four first molars between the eleventh and seventeenth months.
The four cuspids between the fourteenth and twentieth months.
The four second molars between the twenty-first and thirty-sixth months.

THE PERMANENT TEETH ERUPT AS FOLLOWS

The four first molars between five and six years.
The two lower central incisors between six and seven years.
The two upper central incisors between seven and eight years.
The four lateral incisors between seven and nine years.
The four first bicuspids between nine and ten years.
The four second bicuspids between ten and twelve years.
The four cuspids between eleven and thirteen years.
The four second molars between twelve and sixteen years.
The four third molars between seventeen and twenty-one or later.

REGULATING

As soon as the permanent teeth come in they should be observed to see if they take position in their right places, and if out of alignment they should be straightened or regulated by a competent dentist or orthodontist.

DECAY

Decay starts by uncleanliness. Some particles of starchy food will ferment between the teeth or in some groove or pit or on a roughened surface and dissolve the enamel and lime-salts of the teeth, leaving the way open for countless germs to liquify the rest of the tooth.

TOOTHACHE

After decay reaches the pulp cavity, the pulp becomes painful and inflamed and will have to be removed and the root or roots filled with a permanent filling.

ABSCESS

Should the pulp die from irritation or exposure an abscess may form, resulting in destruction of the end of the root or roots and a considerable part of the jaw. By properly cleaning the roots and medications and sometimes by root amputation an abscess can be cured, but it is always better to prevent one by having the tooth filled when the cavity is small, as it will save needless pain and expense.

FILLINGS

Teeth are filled with gutta percha, cement, amalgam, procelain or gold or a combination of several materials. For the most artistic work either porcelain or a silicate cement closely resembling the natural enamel is used. When great strength is desired gold is preferable and can be inserted without much pain or trouble by the inlay method.

CROWNING

When a tooth is decayed so far that fillings are impractical it can still be made useful by crowning with a gold or porcelain crown or a combination of the two.

BRIDGEWORK

After several teeth have been extracted they can be replaced by crowning teeth adjacent to the vacant place, reproducing the lost teeth in gold and porcelain, soldering the parts together and cementing the abutments on to healthy roots.

PLATEWORK

When too many teeth have been lost to be safely replaced by bridgework, plates of rubber, gold or aluminum can be made as substitutes for the natural teeth.

PYORRHEA ALVEOLARIS

One of the principal causes of the loss of teeth is a disease of the membrane around the root of the tooth, called pyorrhea alveolaris. It is accompanied by a flow of pus around the root, by pain and looseness, resulting finally in the loss of the affected teeth, if they are not treated in time to prevent such a loss. Careful removal of the lime-deposits on the root or roots and medication will often result in a cure, so that the teeth can be used in mastication.

PROPHYLAXIS

Prevention is better than cure and it is advisable that a patient visit a reputable dentist at least twice a year to have the teeth examined, cleaned, filled and lost teeth replaced by artificial substitutes. It will pay back in health, comfort and higher efficiency in life.

METHOD OF CLEANING TEETH

Brush your teeth on arising and after each meal with some good tooth paste or powder. Use floss silk to remove food particles between the teeth.

Rinse your mouth with a solution of bicarbonate of soda (ordinary baking soda) one teaspoonful to a glass of water, to neutralize acid fermentation.

The brushing should be done in the following manner:

First: Place the brush between cheek and upper gums well back in the mouth; nearly closing the teeth, bring the brush backward and downward to the lower gums and slightly forward and upward in a rotary motion. Repeat this on the other side. Go back and forth over all surfaces several times.

Second: Brush inside surface of lower teeth and gums with an in and outward stroke, using mostly the end of the brush.

Third: Brush inside surface of upper teeth and gums and the roof of the mouth with a light in and out stroke.

Fourth: Brush the chewing surface of the teeth and the back part of last molar teeth and gums.

Examine mouth with a mirror, holding the cheek back to see if the molars are cleaned and if any food is found, brushing should be continued.

Brush for two minutes by the clock.

Do not use pressure on the brush.

Get a new tooth brush before the old one is worn out.

MODERN DENTISTRY

Is different from what it used to be just a few years ago. A reputable dentist will observe the greatest cleanliness of his person and keep his office clean and his instruments sterilized. He will use modern methods to prevent pain and alleviate suffering and make dental operations a simple task even for the most nervous patient. He will improve his knowledge by reading dental magazines and books and by attending the Dental Society meetings, at least those in his state.

ARIZONA STATE DENTAL SOCIETY

Committee on
Public Dental Education

J. F. TEUFERT, D.D.S., Yuma, Arizona.
J. T. DUNLAP, D.D.S., Phoenix, Arizona.
M. C. DUMAS, D.D.S., Flagstaff, Arizona.

> So great is the effect of cleanliness upon man that it extends even to his moral character. Virtue never dwelt long with filth; nor do I believe there ever was a person scrupulously attentive to cleanliness who was a consummate villain.—*Rumford.*

CHIROPLASTIC MANIPULATION OF VULCANITE RUBBER*

BY DR. DOUGLAS HAIGHT, COSHOCTON, OHIO

THE METHOD OF MANIPULATING RUBBER in making vulcanite plates in this description, I think, is entirely new to the dental profession. I have been practicing this method now for about eight years with success. By close observation of my past experience in this line of work, I have found several advantages over the old method which we all know so well. It is much quicker when you get a little experience, much cleaner and no waste of rubber, no danger of changing articulation. Plate much easier and quicker to finish and no danger of checking teeth.

NO BASE PLATE WAX

The dentist that makes his own plates will find an entire change of program, which he will like and enjoy, and make them with perfect satisfaction. You can vulcanize from three to four plates at one time. I will try to give the reader as explicit a description of this work as I can.

Take good impression and cast, trim the surplus plaster off the cast, to your own judgment of the rim or gum for the contour of lip. Take beeswax, soften and plenty of it, stick it all over the cast except the rim surface. Trim wax to the length of occlusion. Wax up teeth to the bite as usual. After the teeth are all articulated the plate can be taken off the cast and placed in the mouth for trial and placed back on cast with ease. Mix up plaster and fasten teeth on the cutting surface and the sides clear up to where the edge of rim goes. Take out wax on rim surface between teeth; keep the cast dry. Take a small piece of rubber between plyers to answer as a paint brush. Dip it in C. P. chloroform and paint the rim surface of the cast as you would use paint. This is where it is necessary that the cast should be dry. The paint will stick very tenaciously to the cast, the chloroform will carry the rubber into the minute depressions. Here is where you will get the better results in a good fitting plate, by the paint being carried into the little pits and pores. Now take a sheet of rubber, cut it into strips a little over the width of the rim and stick it to the extreme top of the shoulder and bring it clear around and let it come over the cervical edges of teeth, press it all down with the fingers so it will all stick to the paint. Take a small instrument or pen knife blade, grind the blade at the point on the back to a sharp point so it will go between the teeth. Heat it in a gas flame and press the rubber between the teeth. Form the rim with the foundation rubber, and finish with pink facing, in the same way you do the other rubber, and contour the rim to your own judgment after the rim is finished. Mix plaster and cover all over. Use quick-setting plaster. When set cut away the plaster that held the teeth in position. Over the plate surface cut away the wax and trim plaster up to the inner sides of the teeth, scald out wax and dry cast. Paint the surface well, tuck in small strips of rubber in depressions up to and around pins. Take a sheet of rubber, fasten all over floor of the cast, press down well with the thumb. Take hot knife and trim rubber to teeth. The plate will be the same thickness as the sheet rubber and smooth. Rub hot instrument on No. 00 sand paper to keep instrument smooth. Then cover all over with plaster. Use coarse plaster for flasking. It gives better escape for sulphureted hydrogen gas to avoid a porous plate, especially in hasty vulcanizing. I take one hour to bring it up to 320° F. and fifteen minutes longer at that point.

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*Clinic Ohio State Dental Society, 1915.

ORAL PROPHYLAXIS*

BY W. C. GRAHAM, D.D.S., COLUMBUS, OHIO

INSTRUCTOR IN ORAL HYGIENE AND DENTAL MEDICINE, COLLEGE OF DENTISTRY,
OHIO STATE UNIVERSITY

THIS CLINIC IS INTENDED PRIMARILY TO SHOW the technic whereby the oral cavity can be maintained in a state of health, and presupposes that upon presentation to the dentist the diagnosis reveals no morbid conditions. However, since the great majority of cases coming to us for professional care show diseased conditions, it is imperative to effect a cure and restore the oral cavity to a state of health before we can maintain health by prophylactic measures.

The local irritating causes of inflammation, such as tartar, rough edges of fillings and crowns, must be carefully removed. And this does not mean only the salivary calculus so readily observed but the serumal calculus, which is deposited under the gum line, and sometimes completely encircles the teeth or extends far up towards the apex of the root, and the sordes that adhere to teeth and is the best medium for the growth of micro-organisms; all such foreign substances must be carefully and completely removed.

Among the local contributing factors causing inflammation we must note the disposition of the teeth in the arch as to their malposition, as well as to the over work that they may be called upon to do owing to the loss of other teeth; or the lack of work they may do owing to the loss of teeth; badly placed bridges holding as they do large particles of food debris, beneath or above the shelf-like extensions, and the shoulders formed by ill-fitting crowns or poorly inserted fillings.

All these evidences of poor dentistry having been corrected and the tone of the mucous membrane restored, the true sphere of prophylaxis begins; for prophylaxis is prevention, it is safeguarding against disease, not curing it, and our prophylaxis treatment employs such means and methods that will maintain the opsonic index of the oral cavity at such a point that disease can not develop.

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*Clinic Ohio State Dental Society, 1915.

For centuries the tooth brush has been considered sufficient in connection with the tooth powders and pastes to serve this purpose, but caries and disease has steadily increased and this proves that these articles of themselves are not sufficient to keep the mouth healthful. It requires the forcible, systematic removal of the plaques and accumulations, which the brush will not remove, and then the polishing of the surfaces of the teeth, and the stimulation of a normal circulation in the soft parts.

The orange wood points in the hand porte polisher and the tapered wood sticks are the safest means by which these plaques and accumulations can be removed. The tactus eruditis can not be developed and maintained in the machine methods advocated by the venders of the bristle disks and the rubber cups in the engine, but this delicate and important operation must be done with hand instruments.

The mouth should be sprayed with antiseptic solutions under a pressure of 35 to 40 pounds to drive out the particles of polishing powder and debris that lodge between the teeth.

The final polishing can be done with tin oxid used dry on a napkin or cotton roll, held in a kuroris cotton carrier.

The tongue should be scraped and scrubbed with antiseptic solution on the cotton roll in the cotton carrier, and a final spray of some salivary stimulant completes the operation. Following Pickerill's formula I find nothing so pleasant to my patients as his "D" formula, and I always finish with this.

Then instruction to the patients, emphasizing the fact that it is their business and not mine to keep their mouths healthy, that they are to follow my directions like they follow the directions of the physician, and if they do we can accomplish something towards the ends sought; otherwise we shall both fail.

So I insist upon their proper use of the brush daily, and the orange wood sticks and points at least weekly, and that monthly they come to me for inspection and advice. The patients that will follow the directions, will after a short time realize that they never before had a clean mouth, and would as soon discard the bath tub as they would discard their oral prophylaxis regime.

350 E. State St.

When you come to think about it—did your growling ever pay?
Did it ever bend a rainbow—chase a thunder cloud away?
Don't it deafen all the angels when they try to sing an' shout?
Don't they know that there's but little in this world to growl about?
—*Frank L. Stanton.*

INDIVIDUAL RUGAPACK*

BY J. O. HAWKINS, WELLSTON, OHIO

The rugae of the roof of the mouth is the rough and uneven fleshy anterior part, and these rugae are not alike in any two mouths. The function of a rugapack should be to reproduce the rugae, but the ready-made rugapacks are all alike, only different in size. The roof of your mouth is not like the roof of mine, and a rugapack that would suit you, would not suit me. In using the ready-made rugapacks, the idea came into my mind, why not make a rugapack for each mouth that I make a set of teeth for, and reproduce the roof of the mouth, so the person for whom I make the teeth would have a plate just like the rugae of his own mouth. Acting on this idea, I sent to The J. M. Ney Co., and got a roll of tin foil, same gauge as the ready-made rugapacks, and have been making them ever since.

They are very easily made. After the model of the mouth is made, which should be made of Spence's plaster, as it makes a much harder model than common plaster, take the tin foil and swage it to the entire roof of the model, with the thumb and fingers, using also the rubber of a lead pencil, until the rugae are nicely reproduced in the foil. Trim this swaged form to the edge of the ridge of the model, and lay it by until you are ready to flask the case for vulcanizing. After you have your wax form smoothed down well, and as thick as you want the plate to be, take the rugapack and adjust it on the wax form, trimming it nicely around the necks of the teeth, with the proper mechanical forceps, leaving a lug on each side to hold the tin form in the plaster, when separating the flask for vulcanizing. After vulcanizing, strip off the tin foil, and the entire roof of the plate will be finished, hard and smooth, and much better than it can be finished in any other way, and the rugae have been perfectly reproduced, and you have a plate just like the roof of the mouth, that will feel natural to the tongue.

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*Clinic Ohio State Dental Society, 1915.

DIRECT METHOD OF MODEL MAKING FOR INLAYS*

BY DR. G. E. BRATTEN, CINCINNATI, OHIO

In using the direct method of model making for inlays a great deal of difficulty is experienced in obtaining what would be termed a perfect model in wax. I have overcome a great deal of this by making small trays for each individual case with which to facilitate taking the impression from which the model is carved in the mouth. Take the copper cartridges which are used for swaging seamless trial crowns, and with scissors cut same to fit your case for impression. Soften wax as usual, place over cavity; then bring your improvised impression tray into position and with the fingers of left hand on *buccal* and *lingual* flanges force wax to bottom of cavity. Cool and remove, when by examining your impression you will be enabled to see whether your impression has been carried to every angle of cavity; should you notice any portion of impression that has not been carried to the disired point add a little wax at that point and again force to position. When you are satisfied that your impression is correct, remove tray and placing wax impression back into cavity, carve to proper outline and occlusion directly in the mouth. In the final finishing of wax model use the thinnest ribbon saw to pass between adjoining tooth and wax model; follow with enamel linen strip, coated with oil of cajuput which will put a fine finish on model; with pledget of cotton saturated with some of the oil, finish occlusal surface. Then model will be ready to remove and invest as usual. To secure a close, wedged contact, flow a little paraffine at point of contact, which will make finished inlay a little too large at contact, but will be easy to finish and make a perfect contact, which is greatly to be desired in a perfect inlay.

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*Clinic Ohio State Dental Society, 1915.

TOPOGRAPHY OF TOOTH SURFACE AS RELATED TO PROPER RESTORATION*

BY C. H. HEBBLE, D.D.S., COLUMBUS, OHIO

The purpose of this clinic is to illustrate by the use of models the evils resulting from lack of proper contour restoration in our fillings and inlays.

Not ten per cent. of the dentists are paying as much attention to such details as restoration of the marginal ridge, the transverse ridge, or the central and distal fossae of molars as they should; in fact, a general scooped out condition is secured and they are content if the cusps of the opposing teeth do not impinge too heavily upon their filling.

Such restorations perform one function only: they prevent food and other materials from lodging in the cavity; in other words, to use an expression common among the British, they are nothing much but "plugs" for the teeth. Under such conditions, the act of mastication usually forces a considerable quantity of food (especially that of a fibrous nature) between the teeth, and this in turn often completely deranges the entire system of articulation because of having forced one or more teeth either mesially or distally. Of course, an inflamed condition of the gums in and adjacent to the approximal space is always present, due to this material being forced into the space every time the patient masticates.

It also illustrates the very common practice of failing to properly finish our cervical margins, thus setting up such troubles as chronic gingivitis, acute and chronic pericementitis, etc.

These are details of our daily work which should receive the most intelligent and exacting attention of all dentists.

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*Clinic Ohio State Dental Society, 1915.

SADDLE-BACK FACING IN CROWN AND BRIDGEWORK*

BY G. W. RICHE, D.D.S., DAYTON, OHIO

The object of this clinic is to illustrate the advantages of saddle-back facings in crown and bridge work, and the principal feature in the technic is the use of carbon points to core the holes for the pins, thus obviating the danger of checking and making the facings detachable.

Carbon points just the size of the pins in facings can be secured at any dental depot and this method can be used with any pin facings.

To construct a crown: Prepare the canal or canals with a little taper and large enough to form a good substantial post. The end of the root may be left plain or with a shoulder cut around the outer edge to form a flush band when the piece is finished. Select a suitable facing and try in place with a little wax. Bevel the edges of the back and burnish 36 gauge pure gold to the back and trim flush with the facing, leaving the beveled edges covered. Loosen the gold backing and enlarge the pin holes so it will lift off easily.

Warm and work to a point a piece of good inlay wax, approximately the size of the prepared canal with a sufficient surplus to cover the end of the root. Force into the canal as far as possible and with a heated instrument bent to a convenient angle carry the wax to the end of the canal preparation. (A broken explorer shank makes a good instrument for this purpose). Warm up the mass of wax over the end of the root with the hot air syringe and press the facing and backing to place. Have the patient bite and hold the teeth in occlusion until the facing is in proper position. Examine the lingual side to see that it is in line with the root. Hold the facing in place with a small instrument and wax carefully and trim to the root. Insert a sprue in the lingual side and when cool draw the whole piece. Trim up and separate the facing. Place small pieces of carbon points in the holes left by the pins. Invest and cast with 22 karat gold. After the casting is cleaned, drill the carbon out with a small bur, fit the facing and set.

In bridge work the facings may be backed with gold as in the crown and waxed in place. Remove the facings and set carbon points in the holes left by the pins, then invest and solder; or the backs may be cast and assembled, then soldered.

By oiling or using glycerine on the backs of the facings, wax impressions can be made and cast for backings, then assembled.

Saddle-back facings are made by S. S. White and The Dentist's Supply Co., of New York.

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*Clinic Ohio State Dental Society, 1915.

A LITTLE CODE FOR THE DENTIST, ASSISTANT AND RECEPTION ROOM ATTENDANT*

BY L. T. CANFIELD, D.D.S., TOLEDO, OHIO

LIFE IS SERVICE

The man who progresses is he who gives
one hundred per cent. service, or a little more.

The dentist who is successful is the one whose office is operated primarily for the benefit and health of his patients. Without patients there would be no dental office; so it behooves everyone connected with the office to remember this always, and to treat all patients with courtesy and careful consideration. New patients are just as valuable as old patients; remember that, for each new, well-pleased patient is the making of an old patient. See that all do their part to make them want to come back, with the family and their friends.

The waiting-room attendant can greet the patient in such a manner as to assure such patient that "this is the place," "this is my dentist," or she can greet the patient in a way which makes him expect a filthy cuspidor, dirty instruments and a grouchy operator.

The up-to-date dentist has just one thing to sell and that one thing is service. The dentist who sells good service is a good dentist. The dentist that sells poor service is a poor dentist. One hundred per cent. service is not a thing to be supplied to any single patient; it means your best and most efficient service to each particular patient. This is the kind of service your patients pay for when they pay their bill, whether it be for a $2.00 filling, or a $20.00 inlay, and is the kind of service each patient is entitled to.

Every patient (as a rule) who comes to your office, comes because he believes that he can buy better service of you than he can buy anywhere else. Do not take snap judgment. The stranger with broad-brim hat and rubber boots may be president of a railroad or a senator from Missouri. You cannot afford to be chesty or sullen with any patron.

To be able to market your ability successfully means personal efficiency, which is ability to think, to work, to study, to do, or to accomplish with the highest degree of skill and dispatch.

The big men of the world are big because they are efficient; consequently they know what efficiency means and what efficient service can accomplish.

Give this efficient service to your patients, educate them to expect it.

The object of the real dentist of today is to make his business not necessary. If you are interested in getting the utmost out of each day, each dollar, each one with whom you honestly deal, if you make a study of personal efficiency, you will learn the short cut to these accomplishments.

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*Clinic Ohio State Dental Society, 1915.

JACKET CROWN*

BY E. S. FULLER, D.D.S., DAYTON, OHIO

My idea is to impress upon the dentist the importance and present demand for a flush-joint crown and one that can be made to fit in the most perfect manner. Crowns are shown complete for incisors, bicuspids and molars, these having been made for actual use in the mouth. They are all full carved crowns, no stock facings having been used in their construction. The porcelains used were of the highest fusing, White's 2560, and Consolidated.

Although a crown can be completed in a single bake and a fairly good fit be made, especially if the mass of porcelain representing the shoulder is thin, which lessens the pull on the platinum during the shrinking of the porcelain in fusing, a two-bake method is recommended as resulting in a more perfect fit, due to the possibility of reburnishing the platinum after the first baking.

It was shown that a layer of casting wax flowed over the shoulder would prevent any pull on the platinum at the first baking.

Models were shown representing ways of building up the internal core of a tooth where it had been lost; these of both gold and porcelain built around a square post. The cores representing the teeth to be crowned being made of amalgam and obtained by getting an impression of the tooth with modelling compound inserted in a copper band, this band being largest at the gingival end; this form making it easier to fit to the tooth. Then an impression to be taken of the core and space in the mouth in order to preserve perfectly the contact points, and over this a plaster impression.

A model in plaster then is made and the crown constructed as previously described, by building up the porcelain bodies over a platinum coping burnished over the amalgam core, the joint being secured by what is known as the stove-pipe joint.

A gold jacket crown for a molar was also shown, a band having parallel sides being fitted to the tooth. Casting wax is built over this to the contour desired. After being cast that part of the gold forming the lap-joint being trimmed off, leaving a flush-joint crown.

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*Clinic Ohio State Dental Society, 1915.

> How oft the sight of means to do ill deeds
> Makes ill deeds done.
>
> —*Shakespeare.*

DEMONSTRATING A FACTOR IN PYORRHEA THAT DOES NOT INCRIMINATE THE DENTIST*

BY S. N. YOUNG, D.D.S., CINCINNATI, OHIO.

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PYORRHEA ALVEOLARIS is an inflammation. The disease begins with the stage of hyperaemia and follows the usual course of inflammation to its final natural termination, provided it is not interfered with favorably or otherwise before that event takes place.

Inflammation is a reaction of tissue to injury. The problem then, is to find the injurious factor.

Two factors, and two factors only, are constantly present in pyorrhea alveolaris, one of these factors is *pus*, the other a *tooth*. Four clinical facts show that the tooth itself is the direct irritant. *First:* In the pyorrhea tooth, constructive change of pulp tissue is always found (recorded), which fact demonstrates a natural defense of pulp vitality against external irritation; *Second:* Pericemental destruction proceeds along the line of attachment to the cementum, which proves lack of harmony between the tooth and the pericementum: *Third:* The function of a suppurative process whose part in nature is to eliminate substance inimical to life. *Fourth:* Illustrates this latter fact when, upon removal of a pyorrhea tooth, the disease is invariably cured, in so far as that particular tooth is concerned.

Only one factor was found to be constant as an irritant *to* the pyorrhea tooth. Thermal tests were made and the result invariable. The food in pyorrhea victims was habitually taken into the mouth at a temperature above the scalding point, i.e. above 150° F. Due to an anatomical fact, *the characteristic lack of sensibility* of the mucous membrane, thermal tests are absolutely necessary.

The only requirements we have found absolutely necessary in treatment are avoidance of food that will coagulate albumin, i.e., the food must be allowed to cool to a temperature below 120° F. In severe cases where extensive tooth substance is exposed from excessive alveolar absorption it is advisable to place a limit at 110° F., the instinctive upward temperature limit, for the reason that irritation can be produced below the coagulating point, although little ill effect would be produced upon healthy tissue by a temperature below 120° F. In patients of sedentary habits physical exercise is required because active metabolism is necessary.

Secondary factors are by no means desirable, and all forms of local irritation should be reduced to a minimum.

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*Clinic Ohio State Dental Society, December, 1915.

Oral prophylaxis is doubly essential. This function should be performed before meals in order to prevent ingestion of suppurative products, and subsequently to prevent dental caries.

Such teeth as have become hopelessly loose should be removed and substitutes supplied in such manner as the judgment of the dentist may decide.

Bridgework is by no means to be condemned in pyorrheal conditions. On the contrary it is often the best way to give support to the loosening tooth. If carefully constructed, with sufficient abutment service, bridgework is merely a form of permanent "splint."

The pathological consequences due to proteid coagulation and chemical reduction of tissue elements from application of excessive (unnatural) heat is of boundless possibilities.

Up to the present time we have associated the following diseases with this destructive factor; Pyorrhea alveolaris, from the conductivity of the tooth, with coagulative results; diabetes-mellitus and stomach indigestion, from destruction of ptyolin and early stomach digestive ferments—proteid bodies—from ingestion of extremely hot food; (it has been previously recorded that stomach ulcers are largely due to the above cause); rheumatism, endocarditis and chronic nephritis, from circulating coagulated proteid, such coagulation being brought about by exposure of external surfaces to unnatural high temperature, usually in the form of hot water, hot applications or the like.

All these diseases we have been able to prove by terminating their course by avoiding the causative factor. We have had no opportunity to test the idea in gout, and in that disease only is the idea theoretical, but very reasonable, because of the fact that uric acid is constantly found in gout, and uric acid is a by-product of fatty degeneration which is the usual course of destruction of tissue following scalds and the like. Symptoms usually manifest themselves according to temperamental or inherited structural weaknesses as explained in greater detail in previous contributions, "Render Unto Caesar" and "New Ideas In Pathogeny" now in the hands of dental magazine publishers.

Don't hunt after trouble, but look for success;
You'll find what you look for; don't look for distress.
If you see but your shadow, remember, I pray,
That the sun is still shining, but you're in the way.
Don't grumble, don't fluster, don't dream and don't shirk.
Don't think of your worries, but think of your work.
The worries will vanish, the work will be done;
No man sees his shadow who faces the sun.

THE TECHNIC IN THE TREATMENT AND FILLING OF ROOT CANALS*

BY J. F. HANNON, D.D.S., TOLEDO, OHIO.

A TOOTH can be devitalized and the nerve canals so filled that asepsis can be obtained and maintained indefinitely. The technic used in this treatment requires that considerable time be used for each detail. For instance, a case of putrescent pulp. At the first treatment formocresol is used after opening the tooth sufficiently to receive the treatment, and this is left for twenty-four hours to sterilize the contents of the pulp chamber and canals. At the next treatment this is removed and any traces of organic matter, which may be present, very carefully removed with a broach. This is followed with a fifty per cent. sulphuric acid solution, on a cotton-wound broach. In getting this solution into the canals, extreme care is taken as the solution is worked upward into the canals, not to force any of the infective material through the apical openings to cause further infection. The canals are thoroughly swabbed in this manner and then bicarbonate of soda solution is used in the same manner as the acid.

Following this a solution of salt and distilled water is used. A fresh solution is made for each case and carried into the canals with continuous swabbing until no traces of putrescence can be detected. The soft tissues, which have been infected will absorb this salt solution, the toxic material will be sterilized, to a degree, and stimulation to repair will immediately follow with subsiding of soreness to percussion. The canals are then dried and filled with Canfield's root canal dressing, carried in on cotton cone. With hot air syringe this is steamed into tooth structure and soft tissues, to further relieve soreness. A point of cotton saturated in the same dressing is then sealed in for at least twenty-four hours.

At the next sitting the dam is adjusted, cotton points removed and more of the dressing is used as a lubricant and again steaming with hot air syringe to fill small tubuli and foramen with resinous portion of dressing, and the canals filled with Canfield's aseptic points. In the technic of using a gutta-percha point care is taken to completely fill the canals. This is made possible by using in the start small points and following with points of the same size or smaller than the first one used, until as many points are inserted as the canals will take. This mass is then heated with hot air syringe to soften, and packed with point pluggers, condensing the whole mass; or in other words making one point from the several points used and completely filling the canals. At the junction of the canals and pulp chamber the excess of gutta-percha is removed, and with hot burnisher the canals are sealed. The tooth structure above the gum is then washed with alcohol.

Following cases of arsenic devitalization a treatment of the dressing on cotton may be sealed into the pulp chamber until the next sitting, to painlessly remove the organic mass.

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*Clinic Ohio State Dental Society, December, 1915.

EDITORIAL

MAKING GOOD

I was talking one day with a dentist who had "made good" and I asked him to what most of all he attributed his success.

His reply was that as he viewed it, his success was not due to any one thing but to a number of qualities that he possessed or had acquired.

As a dentist he said he believed that he was doing creditable work, but at the same time he did not feel that he was a superior operator. There were other dentists in the city who could do just as well and some whose operations he knew were superior to his.

And yet his appointment book was always filled and it was not an uncommon thing for him to have to turn patients away on account of not being able to give them time, while other dentists of equal or superior ability were striving along with comparatively few patients.

I had noticed this and that was what prompted me to ask him to what he attributed his success.

The qualities to which he referred were first, that he was in love with his profession and work.

He had prepared himself as thoroughly as he could for it and had been a close observer, improving himself at every opportunity. He attended the dental society meetings, getting all of the good things he could in the meetings and from conference with fellow dentists in the intervals between sessions. He said that he subscribed for six leading dental journals and *read* them, placing emphasis on the word "read." He also kept posted on the contents of new books and lost no opportunity for advancement, along the line of his work. His ambition was to do better work each succeeding year, and he endeavored to do for each patient what a careful diagnosis indicated best for that patient regardless of what it meant to him.

He always tried to be neat in his personal appearance. He kept his teeth well brushed, his hands clean, and clothing scrupulously neat.

He was honest with himself and his fellowmen. He kept his debts paid and never entered into an obligation unless he knew that he could meet it. He was square with everybody and he let his life, not his words, advertise this fact. He did not sulk and knock and complain, but kept pleasant and smiling, trying to be, as well as seeming to be, a real friend to every man, woman and child with whom he became acquainted.

He was modest and never "talked shop" outside of his office if he could avoid it. He loved friends and was always anxious to meet people and to have them know him, not for the patronage that it brought, but as he said, it made him a happier man.

These, then, are some of the things, to which that dentist attributed his success and they are things that many another dentist could profit by.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bld'g., Columbus, Ohio.)

Abrasive Mixture Used in Cleaning Teeth

To a teasponful of pumice add ten drops of aromatic sulphuric acid for the removal of tobacco stains.—*Practical Oral Hygiene, Adair.*

To Protect the Handpiece from Moisture

Soft rubber polishing cups, size A or B, placed on a bur, polishing brush, or stone, will fit over the nose of the handpiece and prevent grit or saliva from working into the mechanism of the instrument.—*George A. Randolph, in The Dental Review.*

Dental Education of Medical Students

I would like in most beneficent spirit and without any desire to reflect in the least upon medical education to say that *I believe that there is more to be given to the medical student along the lines of dental education than there is to be given to the dental student along the lines of medical education.* I have asked honor-men graduating from medical colleges the question, "How much are you taught in regard to oral conditions?" "Very little." A great many physicians know comparatively little about oral conditions, yet as has been indicated by the previous speakers, there is a tendency on the part of some medical men to dictate to the dentist as to what he shall do.—*Ellison Hillyer, in Dental Review.*

Care of the Handpiece

A good plan is to slip the sleeve off the handpiece and oil, or leave in oil over night, and, also, to put the head of the angle handpiece in oil when not in use, as more handpieces are ruined by neglect than by wear.—*H. J. Bosworth in Oral Hygiene.*

Protecting Gum Margin in Partial Dentures

The clinical experience of all offers a convincing proof of the first and most important essential in design of a partial denture, or, for that matter, any kind of artificial restoration of lost teeth and associated tissues, namely: the *necessity for keeping all parts, be they clasps, bands, half-bands, hoods, saddles, bars, etc., away from the free margin of the gum, let alone sinking between the root and the free margin.—W. E. Cummer, in Oral Health.*

The Use of Clasps

Clasps should grasp the most bulbous part of the tooth and a little above and a little below it, because this gives the best hold, least strains the elasticity of the metal, and is usually the part with a thick covering of hard enamel that can perfectly well bear the friction.—*Douglas Gabell, in Dental Cosmos.*

Controlling Gums While Making Coping

The "screw post" manufactured by the Blue Island Specialty Company is a very useful little device for holding gutta percha in place against the end of a root that has been cut under the gum margin for a dowel crown. The root is dried, gutta percha warmed and pressed into place; the "screw post" is then heated by holding in flame with pliers, and forced through gutta percha into root canal as far as it will go. The head of the screw is then covered with gutta percha and the gums pressed back. This should hold the gums well out of the way till next sitting.—*D. N. Lewis, in The Dental Review.*

Making Injections for Conductive Anesthesia

After you get the needle deep into the tissues, do you ever forget which side of the needle the bevel is on? As this is important to know while passing the needle along the surface of the bone, it is of great assistance to have a marking on the exposed instrument that will, at all times, indicate the exact position of your bevel.

Take a round bur and make a pit on one of the flat surfaces of the octagon hub of your needle. When you put the needle into the hub always see that the bevel on your needle corresponds to the pit made on the hub. This will tell you where your bevel is at all times.—*J. M. Prime, in Nebraska Dental Journal.*

Removal of Wax from Cavity

The removal of the wax from the cavity is a very important detail. This should never be done by prying, nor by any other motion than a straight pull, with perhaps a slight rocking to start it. My experience has convinced me that the best method is to take a slender copper wire, hardly larger than binding wire, of about three inches in length, and heating one end in a flame to plunge it into the wax inlay at any convenient point. When it cools, a handle is formed which will invariably unseat the wax, provided the cavity is properly shaped. If it will not do so, there is an undercut in the cavity which ought not to exist.—*E. S. Tracy, in Dental Items of Interest.*

Matrix Using Celluloid

Lock the strip together by cutting on opposite sides, then heat small serrated flat nose pliers and fuse the celluloid by pinching with the heated pliers. The celluloid in Kodak films is suitable for this work when the coating is removed. To remove coating wash in hot water.—*E. T. Evans, in The Dental Review.*

Impinging Inlays

In fitting gold inlays to cavity where there are intricate conditions or surfaces, heat inlays to redness (provided they are 22 karat gold). This will oxide them so that any impinging surfaces can be seen readily and corrected.—*C. E. Allshouse, in The Dental Review.*

"Within my knowledge there are but two men in the whole world who thus definitely and invariably achieve success in casting gold inlays. Neither one of these is practicing dentistry."—*Editorial in Dental Items of Interest.*

Endamoebic Theory of Pyorrhea

The endamoebic theory of pyorrhea alveolaris is believed to be a preconceived theory based upon an analogy which investigation does not support.—*Percy R. Howe, in Dental Cosmos.*

Pyorrhea and the General Health

As dentists, we have ever failed to attach enough importance to the consideration of the general physical condition of our pyorrheal patients. No doubt our vision has been somewhat narrowed by the rather contracted area in which our operations are performed. When we can so advise our patients as to improve their general health, and accompany this advice with intelligent local treatment, then, and then only, will our efforts be crowned with permanent, satisfying success and Pyorrhea no longer prove a menace to our patients or a catacomb for the burial of our professional reputations.—*R. L. Jeffcott, in Northwestern Dental Journal.*

Devitalizing for Crowns

In adapting shell crowns to molars or bicuspids, is it necessary to devitalize? My own opinion is that in the vast majority of cases, I would say at least ninety per cent., proper preparation cannot be made without devitalizing. My opinion is based on our experience at the hospital clinic. In the majority of cases where a shell crown is to be adapted, students will ask the question: "Shall I devitalize this tooth?" My answer is: "Try it first, and if the pain becomes too excessive, then devitalize." In nearly all cases we have to resort to devitalization. *—A. W. Thornton, in Dominion Dental Journal.*

Burnishing Silicate with Glass Rod

When making a gold inlay for an anterior tooth and placing a silicate facing over the exposed portion it will be found advantageous to burnish the silicate to place with a round glass rod which has been bent in a Bunsen burner to a foot-plugger form. This works most perfectly for these combination fillings.*—M. J. Homan, in Dental Review.*

Use of Hydrogen Dioxid

In a closed or partially closed cavity, the gaseous molecular oxygen exerts pressure which tends to drive infectious material deeper into the uninfected tissue, and therefore out of reach of any as yet undecomposed hydrogen dioxid, thus setting up inflammatory reactions which may and do cause serious results in the form of necrosis and more extensive pus formation.

Hydrogen dioxid should be used only for the disinfection of a free surface where the physcial conditions are such that the evolved gas cannot by any means be brought under pressure.—*Editorial in Dental Cosmos.*

Easy Method for Separating Teeth

Take a piece of waxed floss silk, 8 inches long, through the center wrap a few fibers of cotton or bibulous paper, about 1 inch in length, until about the thickness of ordinary wrapping cord. Saturate with chlora percha, allow to dry for a second and then pass floss silk between two teeth to be separated, at gingival margins, until the enlarged portion is equally spaced labially and lingually. Bring free ends together and tie firmly over the incisal edges. Do not use surgeon's knot.*—E. L. Burrows, in Dental Review.*

Safe and Sane Bridge Work

Time was, and not so very long ago, when a fourteen-tooth bridge was the crowning effort of a man's professional life. Such a bridge having four teeth as piers was a sure thing—a molar and a cuspid on each side of the arch being the ideal condition. But where, unfortunately, no molars were present, saddles were recommended and used, the entire bridge being retained by the two anterior piers. It would be safe to say that not many of such were safe or sane. They had a peculiar faculty of "loosening up" some place. Then screwnails were advocated to facilitate the removal of such pieces for repairs, "and so forth." No one to-day is inserting such bridges, unless, perhaps, the men who are being guided by the advice of some salesman who advocates in some dental journal the advisability of dentists taking a course in "salesmanship." Every sane man to-day recognizes the fact that there is a limit to the extent of a safe and sane bridge, although it may be difficult, or indeed impossible, to fix that limit exactly because of the many factors entering into the problem. The general health of the patient, the force capable of being exerted by the muscles of mastication, the degree of cleanliness observed by the patient in caring for the mouth and teeth, the skill of the operator, etc.—all of these things must be considered if we are to approach to anything like success in our operations along the lines under discussion.*—A. W. Thornton, in Dominion Dental Journal.*

The Forsyth Dental Infirmary for Children

Undergraduate Assistants

During the months of June, July, August and September an opportunity is offered by the Trustees of the Forsyth Dental Infirmary for Children to a limited number of undergraduate students to act as assistants in the clinics of the Infirmary. This privilege permits a student to obtain unusual clinical advantages in the various departments of the institution where Operative Dentistry, Othodontia, Nose and Throat, Oral Surgery, Radiography, Pathological Diagnosis and Research Work are continually carried on.

Operators' gowns and all instruments are furnished. Over three hundred children are treated daily.

For further details apply before May 15th to the Director, Dr. Harold DeW. Cross, 140 The Fenway, Boston.

Permanent Staff Appointments

An examination of graduates in dentistry, (of less than three years standing) for appointments to positions on the permanent staff for full and one-half time service will be held early in June at the Infirmary.

Appointments will be made for one or two years as follows:

Full time service requiring every day, 8 hours per day, with one afternoon off a week, at a salary of $1000 per year.

One-half time service requiring 3½ hours per day either forenoon or afternoon, at a salary of $400 per year.

These appointments will be made subject to satisfying the requirements of the Massachusetts State Board of Registration in Dentistry.

Members of this staff will be entitled to the advantages of reports and clinics by experts in the various branches of dentistry from different parts of the world, in addition to the numerous regular clinics and lectures.

The operators on this staff have the advantage of the clinics and lectures of the Post Graduate School of Orthodontia.

All material and necessary operating instruments will be furnished; up-to-date apparatus including electric engines, sterile instrument trays, fountain cuspidors, compressed air and modern operating-room-type lavatories are available for use.

A diploma of service will be issued to each member of this staff who has completed this term to the satisfaction of the Trustees.

Applications for the above positions should be made not later than May 15th. Information will be gladly furnished to anyone interested, also the date of examination.

Harold DeW. Cross, D.M.D., Director, 140 The Fenway, Boston, Mass.

Goepp's Dental State Board Questions and Answers. Second Edition Revised. Dental State Board Questions and Answers. By R. Max Goepp, M.D., Author of Medical State Board Questions and Answers. Second Edition, Revised. Octavo volume of 428 pages. Philadelphia and London: W. B. Saunders Company, 1916. Cloth $2.75 net.

The questions used in the preparation of this work were in the main collected from lists of questions used by different examining boards.

While the volume is intended primarily for those preparing themselves for examination it will be found serviceable to students in their undergraduate work and to practitioners in general as a ready-reference text-book.

The answers to questions are given as briefly as possible to make the meaning clear and with little didactic or explanatory matter.

To facilitate reference to any subject on which information may be desired, a complete index of subjects has been added. In this second edition a systematic revision of the text and certain changes in some of the answers in order to bring them up to date have been made and some additional questions added. The character of questions asked in State Board Examinations shows but little change from year to year, and such additions as have been made to the text are chiefly for the purpose of keeping the book abreast of the times as a general reference handbook.

SOCIETY·ANNOUNCEMENTS

Northern Ohio Dental Association

On Thursday, Friday and Saturday, June 1, 2 and 3, the Northern Ohio Dental Association will hold its annual session at Hotel Statler in Cleveland.

Dr. G. D. Lovett, 630 Rose Building, Cleveland will mail programs to non-members on request.

Clarence D. Peck, *Sec'y.*
Sandusky, Ohio.

Ohio State Dental Board

The Ohio State Dental Board will hold its 1916 June examination in the city of Columbus. The practical examination will commence Monday, the 26th, at 8:30 A.M. at Ohio State University Dental College and the theoretical examination at 8:30 A.M. Thursday of the same week at Ohio State University Armory on the University Campus.

Ohio State Dental Board,
R. H. Vollmayer, *Sec'y.*

Program of the Section of Stomatology of the A. M. A.

DETROIT, MICH., JUNE 12–16.

Tuesday 2 P.M.

1. Symposium on The Principles Involved in Chronic Mouth Infections in their Relation to General Diseases.
   - (a) Dr. Frederick B. Moorhead, Chicago, Ill.
   - (b) Dr. Frank Billings, Chicago, Ill.
   - (c) Dr. Edward C. Rosenow, Rochester, Minn.
   - (d) Dr. Ernest Irons, Chicago, Ill.

Wednesday 2 P.M.

2. Symposium on Interstitial Gingivitis and Pyorrhea Alveolaris.
   - (a) Bacterial Findings — Dr. A. W. Lescohier, Detroit.
   - (b) Anaerobies in Pyorrhea Alveolaris — Dr. Anna W. Williams. Dr. Caroline Rosenberg. Dr. Charlotte VanWinkle. New York, N. Y.
   - (c) The X-Ray in Diagnosis .... Dr. Hollis Potter, Chicago, Ill.
   - (d) The Importance of a Correct Differential Diagnosis of the Predisposing Causes.............. Dr. M. L. Rhein, New York City.

(e) Some Studies in the Treatment of Pyorrhea Alveolaris.
Dr. Geo. B. Harris, Detroit.
(DISCUSSERS)
Dr. Arthur Black, Chicago, Ill.
Dr. Joseph Head, Philadelphia, Pa.

THURSDAY 2 P.M.

3. Ankylosis of the Temporomandibular Joint.
Dr. Chalmers J. Lyons, Ann Arbor, Mich.
(DISCUSSER)
Dr. John B. Murphy, Chicago, Ill.

4. A Clinical Pathological Study of Malignant Conditions about the Face, Mouth and Jaws .... { Dr. John W. Means, Dr. Jonathan Foreman, Columbus, Ohio.

5. Surgical Procedures Enhancing the Retention of Artificial Dentures, with Report and Illustrations of an Unusual Case.
Dr. Herbert A. Potts, Chicago, Ill.

6. A Study of the Lymphatics of the Dental Pulp.
Dr. Frederick Noyes, Chicago.

Chairman—Dr. Frederick B. Moorehead.
Eugene S. Talbot, secretary.

Tennessee State Board

The next meeting of the Tennesse Board of Dental Examiners will be held at Nashville, Tennessee, commencing Monday at 10 A.M., June 12th, and continuing through Friday, June 16th.

For full information and application blanks apply to

DR. WALTER G. HUTCHISON, *Secretary,*
308 Eve Bldg., Nashville, Tenn.

The Tennessee State

The Tennessee State Dental Association meets in Knoxville Tennessee, June 20, 21, 22, 1916.

H. C. MAXEY, *Secretary.*

Arkansas State Board]

The Arkansas State Board of Dental Examiners will hold an examination at the Marion Hotel in Little Rock, Arkansas, on June 29, 30, and July 1. Applicants must be graduates of reputable Dental Schools. Application and fee should be in the hands of the Secretary fully two weeks before the examination. For further particulars, address,

DR. I. M. STERNBERG,
Fort_Smith, Ark.

National Association of Dental Faculties

The National Association of Dental Faculties will hold its next meeting at the Seelbach Hotel, Louisville, Ky., July 22 and 24, 1916.

Charles Channing Allen, *Sec'y*,
N. W. Cor. 10th and Troost, Kansas City, Mo.

Rhode Island Board of Registration

A meeting of the Rhode Island State Board of Registration in Dentistry, for the examination of candidates, will be held at the State House in Providence, June 27, 28, 29, 1916, beginning each day at 9 A.M. Only graduates of a reputable Medical or Dental College are admitted to this examination. Each candidate must file with the Board and sign in the presence of the Secretary, a photograph of recent date. Each applicant must present in person, his diploma for inspection to the Secretary of the Board.

William B. Rogers, D.M.D., *Sec'y.*,
171 Westminster St., Providence, R. I.

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing June 12th, and continuing six days. For application blanks and full particulars address Dr. Fred J. Prow, secretary, Bloomington, Indiana.

Vermont Board of Dental Examiners

The next meeting of the Vermont Board of Dental Examiners, for the examination of candidates to practice in Vermont, will be held at the Statehouse, Montpelier, commencing at 2 P.M. on June 26, 1916, and continuing for three days.

To be eligible for examinations a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, and (3) a graduate of a reputable dental college.

Applications must be in the hands of the Secretary not later than June 16.

For further information apply to Harry F. Hamilton, Newport, Vermont.

Pennsylvania State Board

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in the Musical Fund Hall in Philadelphia, and the College of Pharmacy Building in Pittsburgh, on Wednesday, Thursday, Friday and Saturday, June 14, 15, 16 and 17, 1916. The practical work will be held at the Philadelphia Dental College in Philadelphia, and the

University of Pittsburgh in Pittsburgh, on the first day, Wednesday, June 14; the operative work being held at eight-thirty A.M., and the prosthetic at one-thirty P.M.

It will be necessary for any applicant repeating his examination to take the practical work over as well as the theoretical. Application papers may be secured from the Department of Public Instruction, Harrisburg. For further information apply to Alexander H. Reynolds, 4630 Chester Ave., Philadelphia.

South Carolina State Board

The next meeting of the South Carolina Board of Dental Examiners will be held at Jefferson Hotel, Columbia, S. C., beginning at 9 o'clock Wednesday morning, June 14th, 1916.

R. L. SPENCER, *Secretary,*
Bennettsville, S. C.

North Carolina State Board

The next regular meeting of the North Carolina State Board of Dental Examiners will be held at the Battery Park Hotel, Asheville, N. C., beginning promptly at 9:00 o'clock on Monday morning, June 26th.

All applications must be in the hands of the secretary ten days prior to the meeting.

For further information and application blanks address the secretary, F. L. Hunt, Asheville, N. C.

The Georgia State Dental Association

The forty-seventh annual meeting of the Georgia State Dental Association, will be held at Macon, Ga., June 8th, 9th and 10th, 1916, beginning at 11:00 A. M. Thursday, June 8th.

The Program Committee is making preparations to bring to this meeting some celebrities, who will give illustrated lectures on some very important topics concerning the dental profession; also same men will give clinics which will be more than interesting to all who attend the association. Besides these men, there will be a program of merit given by local dentists.

All ethical dentists in Georgia are respectfully invited to attend, and become members of this great State Association. We extend a most cordial invitation to the members of other associations to meet with us.

For further information, address the Secretary.

DR. M. M. FORBES,
803-4 Candler Bldg., Atlanta, Ga.

Nebraska State

The Nebraska State Dental Society will hold its 49th annual meeting May 15th, 16th, 17th and 18th, at Lincoln. Headquarters will be at The Lindell Hotel.

H. E. King, *Secretary*
Bee Bldg., Omaha.

Connecticut State Dental Association

The Fifty-second Annual Convention of the Connecticut State Dental Association will be held at the Hotel Griswold, New London, Conn., June 13, 14, 15, 1916.

Papers and clinics of unusual interest have been secured, which with the excellent accommodations offered by The Griswold, will make this the most attractive meeting in the history of this association.

ELWYN R. BYRANT, *Secretary*,
New Haven, Conn.

Michigan State Board of Dental Examiners

The next regular meeting of the Michigan State Board of Dental Examiners for the examination of applicants who may desire to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, June 19, 1916, at 8 o'clock A. M., and will continue through Saturday, June 24th.

For application blanks and all further information application should be made to

E. O. GILLESPIE, *Secy-Treas.*
Stephenson, Mich.

Lake Erie Dental Association

The fifty-third annual meeting of the Lake Erie Dental Association will be held at Hotel Bartlett, Cambridge Springs, Pa., May 18, 19, 20, 1916.

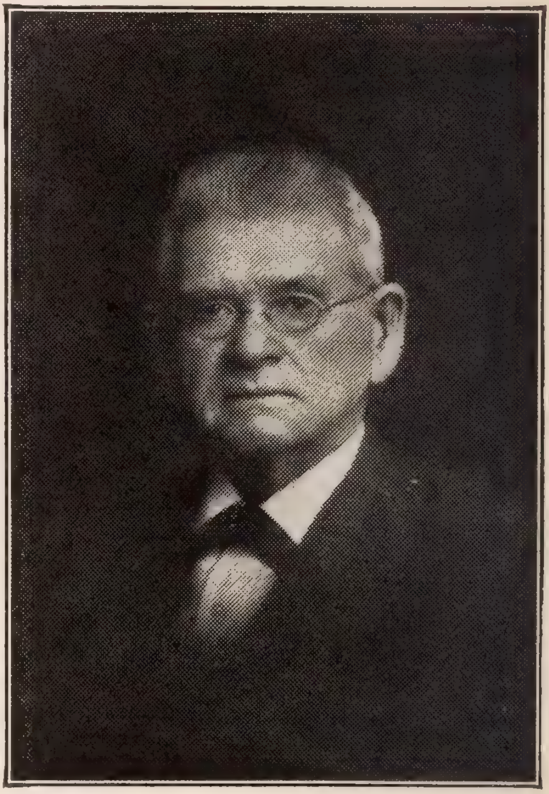
Respectfully,
J. F. SMITH, *Secretary*,
120 W. 18th St., Erie, Pa.

Iowa State Dental Society

The fifty-fourth annual meeting of the Iowa State Dental Society will be held in Des. Moines, May 2, 3 and 4, 1916.

OBITUARY

Dr. Jacob Wesley Greene



In the passing of Dr. Jacob Wesley Greene, the dental profession has lost one of its most esteemed and best-known members, one who for more than fifty years, gave his best efforts to the public.

Dr. Jacob Wesley Greene was born in Harrison County near De Paw, Indiana. January 18, 1839; and died February 27th, 1916.

His mother died at his birth, and he was adopted by a family by name of Friendly with whom he lived until he was twelve years old, when he was apprenticed to a cabinet maker.

He remained with the family of the cabinet maker for about two years; then proceeded to gain an education by working his way through high-school and college, and later studied dentistry in New Albany, Indiana, and Louisville, Kentucky.

When the Civil War broke out, he enlisted and served as a union soldier until discharged because of disability after many months spent in the hospital.

He located in New Albany, Indiana, where he married Miss Ann Aliza Pitt, October 25th, 1863. In 1866 he removed to Chillicothe, Missouri, where he was one of the leading dentists and citizens for many years.

About eighteen years ago he with his brother, Dr. P. T. Greene, improvised the Greene System of special test-method of impression taking and plate work, which he taught all over the United States and Canada.

In addition to instructing a great many dentists in his private course, he spent considerable time lecturing to societies, until today his methods are recognized as being the most practical and common-sense in use.

The result of years of close application to his particular line of work, and having the ability to originate methods to overcome the many difficulties that present themselves, he made himself what he was, an expert in his chosen profession.

In 1910 he published and copyrighted Greene Brother's Clinical Course in dental prosthesis on "New and Advanced Test Methods", which has had and is still having a wide circulation in this country and abroad.

He was a man of great strength of character; a profound student; a man who was always ahead of his time in thought, but lived to see many of his ideas become generally popular.

He was devoted to his family and never was known to spend an evening away from home, excepting on his lecturing tours after the death of his wife twenty years ago. He left four children: Dr. Dora Greene-Wilson, Kansas City, Mo.; Mrs. C. R. Hughes, Kansas City, Mo.; and a daughter and son in the far West.

Britain Makes Artificial Tooth Census.

"Masque de Fer" in the Paris Figaro thus explains what he calls one of the economic disadvantages of the war:

"Platinum comes from Russia and Russia, who knows that Germany is short of it, has decided to sell it only to her allies. The United States, which consumes great quantities of this metal, is complaining of lack of platinum. England has forbidden its exportation, which is complicated by another unexpected prohibition, against the exportation of platinum pin teeth.

"A professor of the Dental School of Paris tells us that in order to protect herself more surely against certain risks of leakage England has begun a census of artificial teeth—not in persons' mouths, of course—but among makers and dealers in them."

Everything that has been done well has been done calmly. Many things that have been done poorly owe their failure to the haste, or lack of calmness, with which they were performed. This peace of mind which helps to win battles is a habit that can be formed by those who are willing to cultivate the tendency to forget rather than fret about trivial mishaps. It is a fact that many people who are strong in meeting great emergencies lose control over themselves as soon as little things go wrong.

—*John R. Meader.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

A fund amounting to nearly $1200 has been raised by popular contribution and turned over to the Flushing, N. Y., hospital for use in free dental clinic.

Wayne, Pa., is considering free clinic.

Dr. Edward C. Kirk is now among the active propagandists along the lines of Oral Hygiene. The movement is to be congratulated.

Tufts' is drawing the lines closer and closer. In recent examination of 128 applicants only 34 passed. Looks as though "the better individual dentist" might become a fact in the near future.

Finday, Ohio, Board of education has established free clinic with Dr. J. H. Boger in charge. A room is to be fully equipped, and the local dentists are to devote a half day each per month.

Plattsburg, N. Y., is to establish free clinic.

Orange, N. J., is to have free clinic for three years.

An Erie, Pa., justice has established a precedent that should be followed elsewhere. A boy truant who pleaded toothache as excuse, was fined $5 and costs, which the parents had to pay, and was ordered to have the tooth attended to at once, under pain of a twenty-dollar fine in case the offense was repeated.

Dr. Walter J. Larson, Portland, Ore., has been appointed member of state board.

The high price of platinum is alleged as a reason why scandal-mongers should keep their mouths closed, provided they are equipped with artificial teeth mounted on platinum pins. Sneak thieves may be tempted.

It is all right to blame poor teeth as a cause of insanity, but what about poor dentistry? D'jever think of that?

Hoyle—"My dentist was a reservist, and he is now fighting for the Fatherland." Doyle—"Administering gas, I assume!"

Dr. A. M. Jacobson, Pocatello, Idaho, has been appointed member state board.

The Cazier Vacuum method of treating pyorrhea has cleanliness to recommend it, at any rate. If you don't know about it, better get wise,

According to the daily press, the long-pending action against Drs. Cassius M. Carr and John J. Kitteringham, Jr., Chicago, has been settled in appellate court by imposition of fine of $50 each for practicing dentistry without license. They were conducting a dental school. There may be something back of this case not visible to the naked eye. Dr. Carr is well known as the inventor of a set of pyorrhea instruments.

The Kalamazoo, Mich., Dental Society is conducting oral hygiene propaganda through the public press. Many of the articles are well worth copying and wide circulation. Anyhow, that's the kind of work that counts. Dentists may not advertise, but there's nothing in the code against advertising the profession.

Many daily papers now carry regularly a department devoted to dentistry and the care of the mouth. The ball seems to be rolling better and better every day.

The Fox River Valley society is behind a publicity campaign out in Illinois.

If dentists will cut out these pages and turn them over to their daily papers they will be able to secure a lot of publicity. Some are doing it.

If the Auburn, N. Y., society pushes hard enough a free clinic or two may result; dental inspection seems not far away.

California has the fever. Efforts to establish free clinics are reported from various points.

Free examination now at Soiux City, Ia.

Duluth, Minn., trying to raise money by popular subscription to pay part-time practitioner in free clinic.

Dr. B. J. Cigrand, Aurora, Ill., president of the Fox River Valley Association, is leading a movement for the establishment of free clinic for the deserving poor regardless of age! That's new and good. There are plenty of clinics for children, but this is the first for adults so far as we are advised. Go to it! We dentists will become really professional if the ideal of Service continues to expand.

Reported that 96% of Omaha school children have bad teeth. Plenty of room there for missionary work. The new free clinic is busy.

Force this fact home: Poor teeth mean low grades; low grades mean failure to pass; failure to pass means doubling and trebling the cost per capital for public education. Free clinics are infinitely cheaper.

Altoona, Pa., is moving in the direction of free clinics.

The San Antonio, Texas, free clinic is open every Wednesday afternoon. The various school buildings have appointments in turn.

The Modern Ethical Dental Association believes in advertising. No wonder that organization is growing like a two-year old.

The Searcher

A woman's laugh, however gay,
Or simpering, or simple;
Is often merely a display
Of dentistry or dimple.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVI JUNE, 1916 No. 6

OFFICIAL ORGAN

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

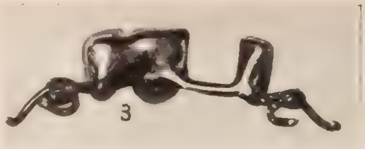
HYGIENIC REMOVABLE BRIDGEWORK

BY J. W. BEACH, D.D.S., BUFFALO, N. Y.

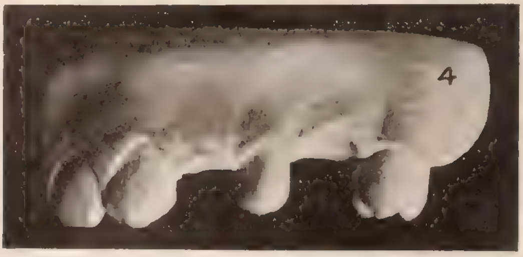
AFTER NEARLY FIFTEEN YEARS of progress which has been fortified and tempered by experience, it affords me great satisfaction to present the results to you as exemplified by what I am pleased to term Hygienic Removable Bridgework. I am also prompted to do this because of the expressed desire of many members of the dental profession for technical knowledge to aid them in the construction of bridges by this method.

Perhaps one of the most pertinent questions before us today is that of the best method of replacing lost teeth. The requirements for the ideal means may be summed up as follows: First of all is to reproduce adequate mastication surfaces; second, to obviate unnecessary destruction of, or interference with, abutment teeth; third, to give the maximum degree of comfort; fourth, to occasion the minimum amount of pain and discomfort in the accomplishment of these several requirements.

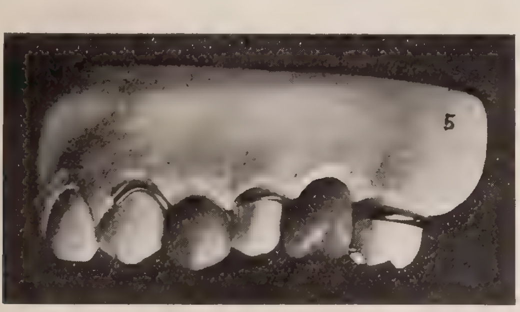
Present-day patients have a right to expect methods of dentistry that are commensurate with present-day progress in every other field of endeavor and, in consequence, we must meet the demands if we are to give the greatest good to the greatest number. We are able to supply not to exceed one tenth of the needs for dental service throughout the civilized world, and if we wish to be looked upon as real benefactors who are imbued with the true spirit of our profession, we should endeavor to meet this need in so far as we are capable. The method we champion was developed with this thought as one of its fundamentals.



It is essentially a method of retention based on the use of bars, rests and clasps. These may be said to embody the salient features of the suspension and cantilever principles, and may be adapted to the case in hand according to the ingenuity and ability of the operator. In other words, the success or failure of this method depends upon the proper combinations of these various principles in their application to a specific case. Therefore it furnishes almost an illimitable range for the dentist's capabilities, and is, in consequence, extremely fascinating and engrossing.



We believe the adoption of this method to depend in a great measure upon ridding our minds of a few well-founded prejudices which have been, from time immemorial as it were, handed down from generation to generation of dentists and from which it is high time we were released. First of all we must be convinced that a correctly made and placed clasp *does not* injure contacting enamel surfaces. It will take more than a corkscrew to pull that notion out of the heads of many because they cannot rid their minds of the pictures of the old-fashioned broad clasp. Did you ever stop to seriously consider the fact that no matter how broad or narrow a clasp may be, it has but *one point* of contact occluso-gingivally? And if it be swaged or burnished to the bucco-lingual surfaces to give close contact over a broader area, does that help the situation? Not at all. A correct clasp must have minimum contact with the enamel surface and be as nearly stationary as possible. Round wire of the smallest adequate gauge is most satisfactory as the contact will be only a line in diameter. I have yet to meet with the *first instance of disintegration*, either superficial or otherwise, occasioned by a clasp made of round wire.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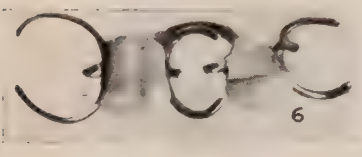
The occlusal finger-rest is an essential part of the clasp as it keeps the clasp from pressure upon the gingivae. Space for this rest between occluding teeth is secured by careful trimming from each tooth for its accommodation, after which the surfaces are thoroughly polished. The universal clasp used in this method may be termed the modernized three-point Bonwill clasp, which has been in use a great many years.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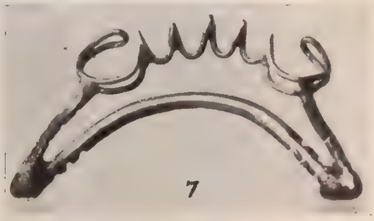
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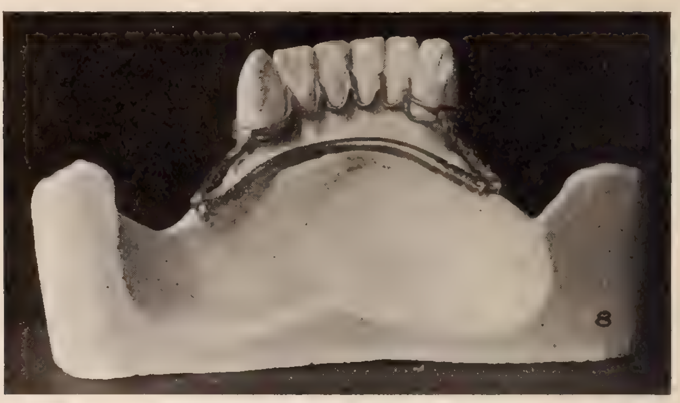
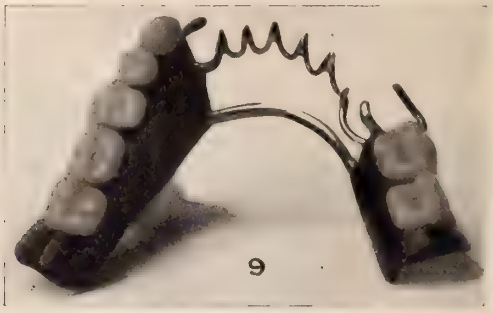
Another so-called prejudice which perhaps might better be denominated fear, is that these bridges are liable to come out and possibly be swallowed by the owner. I can assure you that such liability is very remote and of the hundreds I have placed, not one has thus far passed beyond the mouth on the alimentary route. Their retention and location is assured and no anxiety need be felt so long as the construction and placement of the bridge is correct. These pieces are easily cared for by the patients who can remove and replace them at will. They are also removed by the dentist during general prophylaxis treatment, properly cared for and replaced.

One might recount a considerable number of reasons for and against this method but actual experience seems to have eliminated very close to one hundred per cent. of the objections in my hands, and in the further development of this method it must prove a most satisfactory means of supplying lost dental organs.

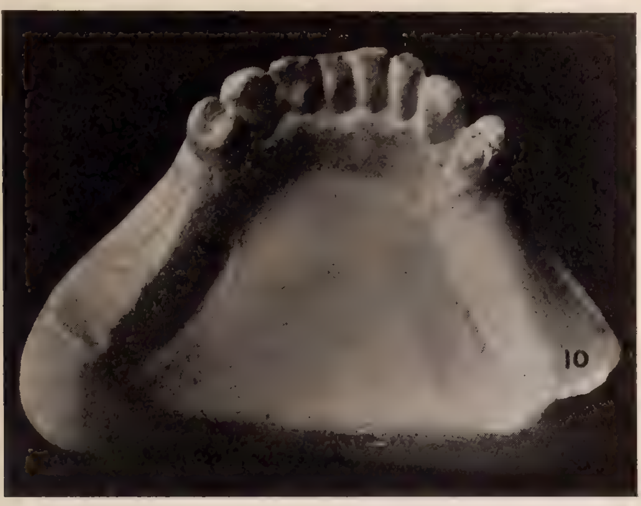


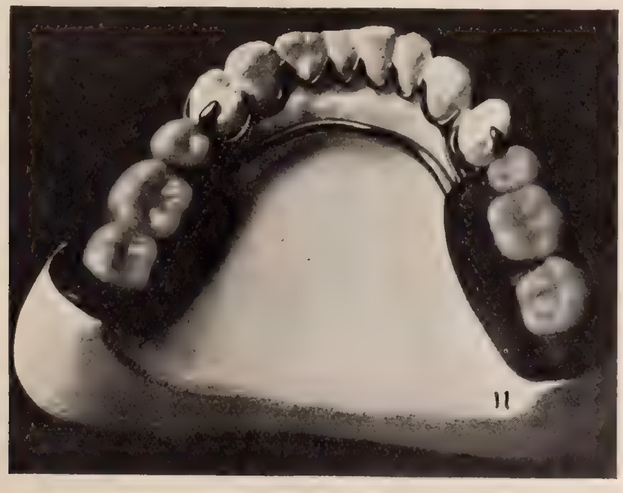
The method consists in the adaptation of different sizes and forms of gold clasp wire to meet the requirements in a given case.

Figure 1 shows a cuspid being carried by two clasps. It is thoroughly practical in the great majority of cases but we recommend it only when other attachment cannot be obtained without undue loss of good tooth structure or normal pulps. It is safe practice to use modeling compound for impressions if the teeth are parallel longitudinally and not so long as to occasion much "draw." Slight distortion may be allowed for and sometimes trimming the approximate surfaces may be done with safety. A good plaster impression, however, is preferable. After the model is mounted, the clasp wire is easily formed to the tooth surfaces, the tang or finger-rest fitted, caught with hard wax to the clasp wire. The second clasp is formed in the



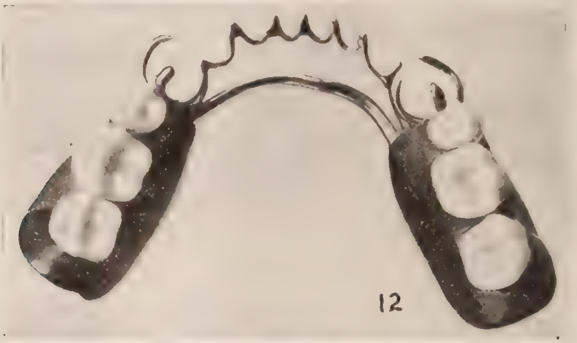
same way; the backing for the interchangeable porcelain is adapted, caught to the clasps with wax, after which the porcelain is ground to its proper position. The porcelain is then laid aside and the clasps and backing carefully removed, invested and soldered. The frame-work is fitted to the teeth in the mouth, attention being given to proper occlusion of the tangs. The porcelain is then adjusted and occluded, after which the piece is removed, the porcelain cemented to place and in ten to fifteen minutes the piece is ready for the mouth. This procedure is applicable to all bridges where interchangeable teeth are used. Gutta percha cement is well adapted to this use as, if occasion requires, the porcelain may be removed without difficulty.





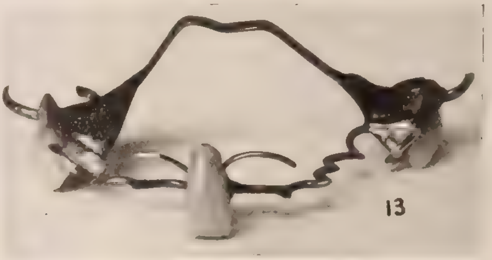
More than two supplies as a rule should not be made without a saddle because of the strain upon the abutment teeth. This applies to fixed bridgework just the same. In some cases three teeth may be carried by this method without the saddle because it does not interfere with the natural movement of abutments in their sockets.

Figures 2 and 3 show a unique way of supplying a central and laterals after immediate extraction. It requires but ten minutes to make the change.


12

The labial and lingual aspects are here shown. The gum tissue has assumed a normal position about the necks of porcelains and the piece gives every promise of permanency.

Figures 4, 5 and 6 show how this method may be used to swing about other teeth. No explanation is necessary except, perhaps, that the lingual bar passing about the second bicuspid should stand away from the tooth at least three millimeters to accommodate shrinkage of the metal as well as avoid contact with enamel surface. One might show case after case of this work without saddles, but the practical dentist will need little more to readily comprehend the universal application which this system permits.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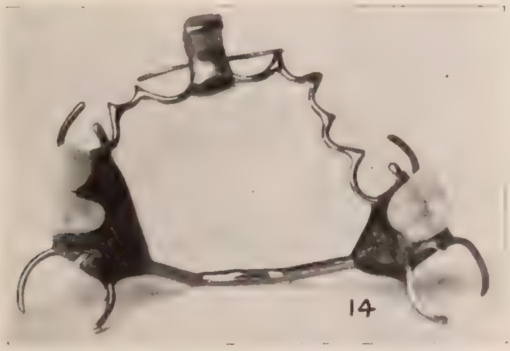
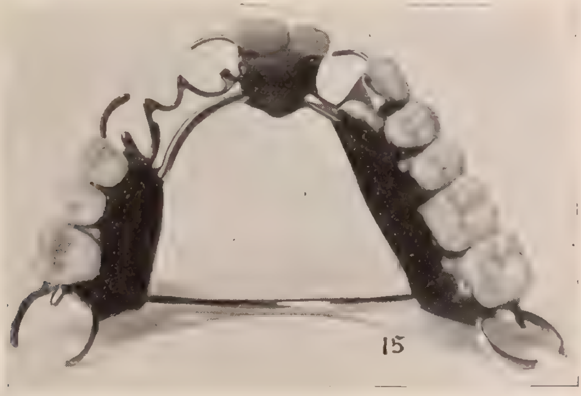
What we believe to be our greatest development in this work is the so-called "interdigital" bar, illustrated by figures 7, 8 and 9. Little explanation is needed to impress the practical phases of this construction, for they are self evident. I may say, however, that Figure 8 gives an adequate idea of its advantages, perhaps first of which is completely overcoming "heel raising" in such cases as is here illustrated. A second great advantage is freedom of oral fluids and air about the mucous membrane and teeth, and third, but by no means least, the interdigital bar furnishes an excellent splint for loose orals. This alone is well worth the price of admission. It has proven a veritable boon to many of my patients.

Figures 10, 11 and 12 show an ideal case which is most satisfactory both to patient and dentist. The interdigital bar is made in individual sections, each crescent-shaped piece being fitted to the lingual surface, waxed to the adjoining one, removed, invested and soldered. Sections of twos are joined together in the same way until the whole piece is completed. It is then attached at either end to the base wire and the clasps, or the clasps may have a bar attached to extend into the rubber entirely separate from the other bars. A little practice will make one familiar with the technic.



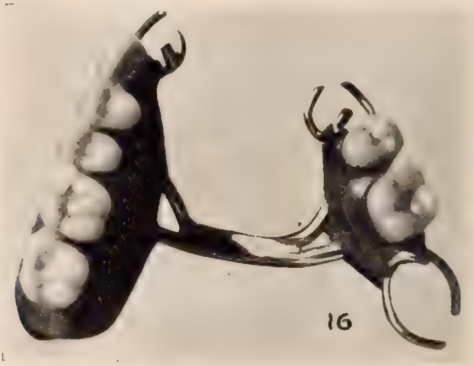


Figures 13 and 14 illustrate an unusual condition. Pyorrhea induced by malocclusion had so loosened the teeth that they had been forced out of position, creating a space between the centrals of sufficient width to accommodate a full sized lateral. The bridge supplied all missing teeth as well, and the interdigital bar made a perfect splint for the loose ones.

Figure 15 supplies ten teeth and gives the patient a free palatal region. This supplanted the ordinary full rubber palate and it is needless to say that the patient has enjoyed the change.

Figure 16 represents a double palatal bar supporting lateral pieces which are retained by clasps.

Figure 17 is a lower piece for the preceding case and illustrates certain possibilities in the construction of such cases in that but one investment and soldering was sufficient to attach the numerous parts.


16

Figures 18 and 19 show a little stunt that ofttimes helps one out of a trying situation. Attached to the rubber is seen a T shaped clasp which engages the cuspid and the first bicuspid. Attached to the opposite end of the palatal bar is a full clasp, or Jackson crib. You will also observe a short extension mesially and distally which engages the adjoining teeth on the buccal surfaces, giving the piece the support of five teeth.

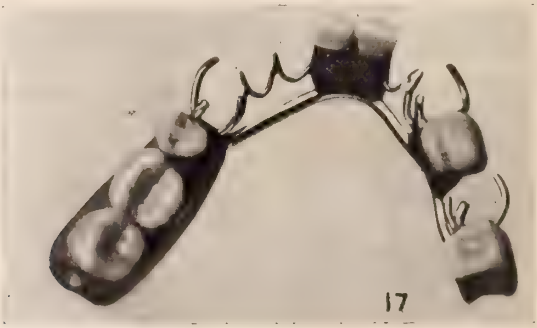

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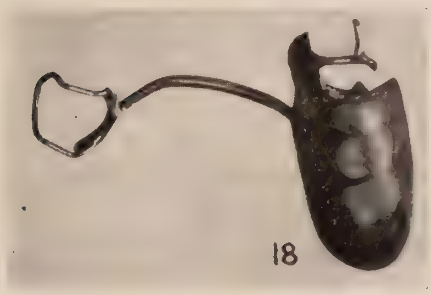
Figure 20 is another way of supplying masticators where they are much needed. The teeth are retained by two full clasps and when properly done is a very satisfactory piece. The clasps are made according to Dr. V. H. Jackson's method, by burnishing 24 K, 36 G. gold plate over the lingual aspect of the tooth and conforming the clasp wire to the other surfaces, investing and soldering in the regular way.

The saddles shown in these pictures are all of rubber and it is, of course, the most practical material for general use; however, the gold saddle is frequently used to the advantage and refinement of the work. One natural consequence of the interdigital bar is its protection of the gingivae. Not only does it keep salivary calculus from forming about the necks of the orals, especially the lowers, but it prevents consequent resorption and the formation of pockets. This has been demonstrated in scores of instances.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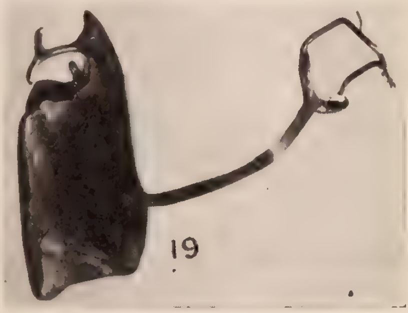
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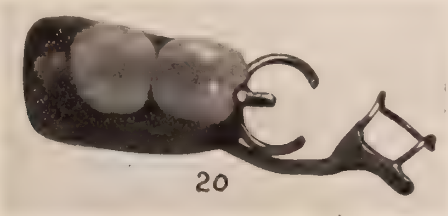
Perhaps one of the best arguments in favor of this method is that the teeth are not injured by its employment, hence should a given case prove a failure, at least you have done the patient no injury. Even so flimsy a commendation as that is not applicable to the same degree to any other method.

The clasp wire used is gold, 16 K., as follows:

Half-round base wire	gauge 11.
Half-round clasp wire	gauge 14.
Round clasp wire	gauge 17.
Round interdigital wire	gauge 20.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These wires may be obtained from any supply dealer. Those wishing further information can obtain it from the writer who will be glad to cooperate with anyone wishing to take up this work. This method is not given the profession with the idea that it has reached its fullest development. In fact, it is sincerely hoped that the simple principles here presented may, through the impetus of the wonderful ingenuity of the American dentist, expand into the ideal means of replacing lost dental organs and thereby give the writer the supreme satisfaction of having done something worth while for his beloved profession and the world of humanity. Then he will feel as all good citizens should, that he has left this little old world a little better off in return for its tolerance of him for so many years. The writer has but one request, or demand, if you wish, to make: Never refer to these pieces as "plates." The method is properly christened Hygienic Removable Bridgework, and always should be referred to in this way. Otherwise you depreciate the value of the work and will find it more difficult to command a commensurate fee.

And now, in the words of some long forgotten immortal: "It is yours! Go to it and do it." Thus endeth the lesson.

Professional Bld'g.

PYORRHEA ALVEOLARIS—A CONSIDERATION OF ITS ETIOLOGY, PROGNOSIS, AND TREATMENT TO DATE*

BY DR. JOHN B. WEST, ELMIRA, NEW YORK.

WHEN SMITH AND BARRETT in July 1914, and Bass and Johns in September of the same year, published their findings relative to the discovery of the endamœba buccalis in pyorrhea lesions, with disappearance of the amœba and recovery of the pyorrhea condition in the majority of cases treated by medication of emetine hydrochloride, we were encouraged to believe that this debated question of the etiology and treatment of pyorrhea was finally settled. In this we were disappointed, for some of our most noted research workers have not been able to corroborate the findings of the above mentioned gentlemen, and the panacea for the cure of pyorrhea remains yet to be found.

The author of this paper believes that it is conceded that the first extensive studies of the pathology of this disease were done by Talbot. Both in the human and animal jaws Talbot made transverse sections showing the various pathological stages from the initial inflammation in the gingivae to the destruction of the peridental membrane and the absorption of the alveolar process. The *Dental Cosmos* for 1911 contained an elaborate series of articles by Hopewell Smith, on studies of the pathology of pyorrhea from sections of the human jaw. Znamensky of the University of Moscow, in the *Journal* of the British Dental Association for 1908, gave a report of a direct microscopical study of the retentive structure of the teeth affected by pyorrhea alveolaris. In the *Canadian Dental Journal* for June, 1912, appeared an article by Thomas B. Hartzell of the University of Minnesota, which reviewed the pathological studies of Talbot, Smith and Znamensky, and so far as the author is aware was the first to call attention to the histopathology of the denuded cementum, and the bacterial holding power of crypts of the cementum. The late Dr. G. V. Black, in his work on

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*Read before the Buffalo Dental Association, March, 1916.

Special Dental Pathology, has done some fine original microscopical studies on the histo-pathology of diseases involving the peridental membrane.

In my discussion of the etiology of this disease, I will draw freely from the studies of the pathologists above mentioned.

Let us for a moment consider the histo-pathology of the tissues involved in pyorrhea. The peridental membrane is made up of bundles of fibers which are attached to the tooth on one side and to the alveolar process on the other. Along the surface of the cementum lie the cementoblasts with the fibers of the peridental membrane passing between them. The cementoblasts build the cementum around the fibers of the peridental membrane. This membrane according to Black is able to repair the injuries to its own tissues, but does not repair its own tissue when any considerable part of this is detached from the cementum by suppuration. The cementum likewise has the power of repair as long as the fibers of the peridental membrane are attached, but as soon as it is stripped of this membrane it becomes a dead tissue, even though the pulp of the tooth is alive. In this respect the cementum differs from bone as it has no circulation of blood aside from what it receives through the peridental membrane.

On the inner surface of the alveolus lie the osteoblasts, with the fibers of the peridental membrane between them. Whenever these fibers lose their attachment, whether by absorption of the bone or otherwise, these cells build on more bone about the fibers, and the fiber ends calcify with this bone and are then reattached to the bony wall.

The cementum does not build itself, nor repair injuries to its own tissue. It is laid down on the dentin by the peridental membrane and certain of the cementoblasts are left in the cementum as living cells and are known as cement corpuscles. The structure of the cementum is very similar to bone, as the cement corpuscles are contained in lacunæ, and processes branching in every direction from them are the canaliculi.

When the fibers of the peridental membrane are destroyed by suppuration the denuded cementum becomes a dead tissue, and where it has become infected and pus-soaked, no reattachment whatever can be made to it by living tissue. Lister in 1867, recognized this thought and it has later been re-emphasized by Macewen and Black. I wish here to emphasize the bacterial holding power of this denuded cementum as brought out by Hartzell. Whenever the fibers of the peridental membrane are detached from the cementum, whether destroyed by suppuration or traumatism, the butt end of the fiber is retained in the cementum, and we have an organic tissue surrounded by a wall of cementum. This gives the surface of the cementum a rough and pitted condition and each fiber end becomes dead tissue; a fine pabulum for the numbers of micro-organisms that invade pyorrhea pockets. How fruitless to expect to have a pyorrhea pocket permanently heal when the cementum is left pus-soaked and loaded with bacteria.

In the June, 1912 issue of the *Canadian Dental Journal*, Dr. Hartzell, in an article on pyorrhea, makes the statement that he believes that by freshening the edge of the alveolar process in our root surgery we have a pouring out of the osteoblasts at the bottom of the pocket; and that if we can prevent pressure and infection a deposit of new bone will be formed for a variable distance on the root. Certainly it is the experience of every pyorrhea clinician that after successful root surgery, the roots of the teeth even when quite loose are very materially tightened in their sockets. Logan reports a case where there was an evident growth of alveolus around a tooth after thorough root surgery. The late Dr. Fletcher reported several cases with a like result.

This is based on the classical researches of Macewen, of Glasgow, who, in his work on the Growth of Bone, proved that the bone grows by a proliferation of the osteoblasts and not from the periosteum. We will be able to further prove this assertion in the near future by a careful comparison of Roentgenograms taken at different stages during the treatment.

Now let us summarize the histo-pathology of the retentive structures of the teeth which are affected by pyorrhea alveolaris.

First: The cementum is a specialized tissue without any blood supply. It has no power of repair when the peridental membrane is detached from it, and it is made up of a hard dense layer to which the fibers of the peridental membrane are attached. Directly under this special layer toward the dentin of the root is a layer of cementum with openings or lacunæ which contain cementoblasts or cement corpuscles, and connecting these lacunæ are branching cells called canaliculi.

Second: The peridental membrane is able to repair injuries to its own tissue, but does not rebuild same when any considerable part of this is detached by suppuration.

Third: The alveolar process is a true bone and does repair injuries to itself, and where the fibers of the peridental membrane are loosened by absorption of the bone or otherwise, the osteoblasts build new bone around the peridental membrane fibers; but this does not occur when the peridental membrane is destroyed by suppuration. We are also led to believe by the researches of Macewen that by freshening the edge of the alveolar process by a proliferation of the osteoblasts, a new growth of bone will partly fill the pocket if we can prevent pressure and reinfection.

We believe that there are two factors entering into the etiology of pyorrhea alveolaris, a "predisposing" factor and an "exciting" factor. Any dentist who has had very wide clinical experience has noted that open contact points, faultily finished fillings, improperly fitted crowns, traumatic injuries to the gingivae by use of the separator and finishing strips, have caused a break in the peridental membrane with a resultant absorption of aveolar process and the formation of a pocket.

Black, Znamensky and Hartzell hold that the disease always begins at the gingival margin and transverse sections of the jaw of humans, and animals with pyorrheal inflammation show the deepest inflammation in the gingivæ, and the masses of leucocytes progressively less as we approach the deeper structures. This fact seems to be given little consideration by

Talbot and Smith, in their search for the point of origin, they being more interested in the pathological changes taking place in the deeper structures in the advanced case.

In the last few years there has been considerable work done to find the specific organism that is responsible for pyorrhea infection. Noguchi of the Rockefeller Institute, by improved culture methods, found a new species of spriochæta which he has called the treponema mucosum. These organisms are anræobic; require eight to ten days to grow; they are mucin-forming and give an odor characteristic of the disease. It is also interesting to note that the organism will not grow on healthy tissue, but requires such tissue as occurs in disturbed metabolic states. Noguchi also has isolated from pyorrhea pockets in pure culture the spirillum vinci, together with the fusiform bacilli. This latter organism has been found also by Hartzell and Henrici of the Research Commission of the National Dental Association. These last investigators have found the streptococcus viridans and the fusiform bacillus absolutely universal in pyorrhea pockets.

Drs. Barrett and Smith, of the University of Pennsylvania, and Drs. Bass and Johns, of Tulane University, Louisana, assert that the protozoa endamœba buccalis is the specific cause of pyorrhea. Prof. Chivaro, of Rome, has not been able to substantiate the findings of the above mentioned investigators, and says that the endamœba buccalis is harmless. This would seem to conform with other noted biological workers, namely Craig and Flexner. Hartzell and Henrici have been unable to clinically note the improvement claimed by Smith and Barrett, and Bass and Johns. The amœba has not been obtained in a pure culture, neither has Koch's postulate in any way been fulfilled. The evidence rests upon the clinical observation that emetin hydrochloride, a known amœbicide, showed very favorable results in the majority of cases treated. More careful investigation must be conducted pertaining to this subject before the connection of amœba with pyorrheal inflammation can in any way be decided.

In 1907 Dr. L. T. LeWald read a paper before the New York Pathological Society, in which he showed that amœba could be demonstrated in the mouth constantly, no matter how much care be taken of the teeth. Hartzell reports that he has the amœba constantly in his own mouth, although he is free from pyorrheal inflammation.

In the fall of 1914, the author commenced the use of emetin hydrochloride hypodermically, in the treatment of a few selected refractory cases of pyorrhea, believing the work of Barrett and Smith and Bass and Johns should receive full credit. On the first case used, after carefully washing the arm with alcohol, ⅓ grain of emetin hydrochloride was injected from a sterile syringe. In 48 hours the arm began to swell and an intense cellulitis resulted. Around the needle puncture small vessicles formed, which the third day broke and for a period of a week a serum discharged. This serum would soak through five or six layers of gauze several times per day. Boracic acid was used as a dressing powder; later I used aristol and finally the wound healed. I might say that prior to the hypodermic injection into the arm, the emetin was injected in the pockets around the teeth as recommended by Barrett. An intense malaise ensued which lasted several hours. This case was reported to Dr. Bass but received a somewhat evasive reply.

Since that experience I have used emetin hydrochloride experimentally in a few cases to learn whether I could corroborate the findings of the above-mentioned investigators, *but I have yet to see a case but what has to have other treatment besides emetin to secure any permanent result.*

It is conceded today that no known organism that has been isolated in pure culture has the power of attacking a healthy gingival margin; there must be a break in the attachment of the peridental membrane or its resistance so lowered by metabolic conditions as to make it especially susceptible to the poison proteins induced by the pressure and destruction of mixed bacterial infections by the body ferments. This latter view is held by Hartzell who, in April 1915, before the Chicago Dental Society, advanced the theory that the heavy deposit of bacteria, especially the streptococcus viridans, on the surface of the teeth not scoured by the food during mastication, results in the introduction of these bacteria into the tissue by direct continuity of tissue. In fact Hartzell has demonstrated that it is easily possible for bacteria to enter the peridental membrane from the gingival culdesac.

The author believes this to be a fact as to the infection of pyorrhea, but believes also, that there must always be an inflammation of the gingivæ by local causes, as open contact points or traumatic injuries induced by the dentist, or a predisposing factor as may result from faulty metabolic conditions so that the resistance of the gingival tissue is lowered.

I agree with Talbot that the alveolar process is a transitory structure, and is supplied with end arteries; consequently less resistant to irritants than tissues more permanent in their physiological necessity to the life of the organism.

In preparing this paper I tabulated the results of the physical diagnosis of 25 cases of pyorrhea alveolaris treated recently. The 25 cases present the following significant facts:

General health—4 poor, 13 fair, and 8 good. Constipation—13. Stomach disorders—14. Anaemia—19, that is having hemoglobin 80 or less as tested by the Talaquest method. Urinalysis positive in 9 cases showing in some indicanuris, acidosis, deficient urea. Pain in joints—11. In addition most of these cases had a blood pressure test, heart examination and red and white count, and some a differential count of leucocytes. I might mention that out of the 13 who had a complete red and white blood count, 7 had an abnormal blood count.

From a fairly accurate record of 100 or more cases that have been treated for pyorrhea in the last few years, and data collected relative to their condition, the author is convinced that deranged metabolism and the formation of toxins from proteins is a predisposing factor which must be given serious consideration. It will be seen that from the 25 cases reported, very few were in normal health.

According to Talbot, toxins are formed in the intestinal canal, especially from protein metabolism, and these poisons which are not carried off by the bowels, are carried by the portal system to the liver. Any derangement of the bile or liver cells which interferes with the proper function of rendering poisonous substances innocuous would cause abnormal and poisonous substances to be carried through the blood stream. The kidney is the chief outlet for poisonous substances which the liver fails to modify.

In case there is an excess of poisonous substances the kidneys fail in their proper elimination, the toxic materials accumulate and the result is renal inflammation and albuminaturia. When this takes place the blood stream becomes charged with poisons, and these, circulating in the end arteries of the alveolar process cause an irritation of the inner coat of the blood vessels, with a consequent thickening of this coat, thus an obliterating endarteritis, which is the specific lesion of pyorrhea infection.

To make myself more clearly understood, it being the toxins retained in the end arteries of the alveolar process which cause all of the phenomena of inflammation, with the resulting arterio-obliterans and the production of bone absorption by halisteresis, Dr. Talbot claims that when only a small area is involved, lacunae absorption of bone only occurs.

To the author the infection of the pyorrheal lesion is only an incident, as every dentist has seen bone absorption, a deep pocket and apparently no pus. It is in tissues weakened by conditions such as we have described that are very susceptible to the proteins induced by the presence and destruction of bacterial infections, such as the streptococcus viridans and the fusiform bacillus.

The treatment for pyorrhea alveolaris is prophylactic. We have seen by a consideration of the histo-pathology of this condition that we cannot expect the restoration of the peridental membrane, where once it has been destroyed by suppuration; nor reattachment of the fibers of the peridental membrane to the denuded cementum where it is pus-soaked. We must educate ourselves to make a more careful examination of the mouth, so that open contact points may be corrected, and to see to it that faultily fitted crowns are never placed on teeth. The author firmly believes careful physical examination of the patients relative to blood pressure, heart examination, blood examination and urinalysis, will be a vast help in making a proper diagnosis of the condition and will also add very materially in suggesting the proper systemic treatment.

From a local standpoint the first necessity being the use of the disclosing stain as suggested by Skinner, of Chicago, the operation being to stain the surfaces of the teeth. This stain will show the masses of bacteria which are not scoured off by the food during mastication. This process is beneficial to the patient as well as to the operator. To the patient it will show those surfaces of the teeth to which he is to devote the most attention in his daily prophylaxis; and to the operator because as Hartzell states, it explains to him the reason for gingival inflammation where often no other rational cause can be found. To those who may be unfamiliar with the composition of disclosing stain, I will state that it is made up of iodin, 50 grs., zinc iodid and potassium iodid, 15 grs. each, water and glycerine, making a total liquid bulk of one ounce, with a total bulk of 80 grains of solid material incorporated therein. After the disclosing stain has been applied, the tooth surfaces which are rough and harbor bacteria should be smoothed with fine stones, and finished with a preparation which will give a high polish, such as Carmi Lustro for instance. The polishing of the tooth surface with a stick and pumice flour should be done before any root surgery is undertaken, as pumice grit forced into pockets is very irritating to tissue cells. The rough, pitted and uneven surface of enamel next to the gingival margin, which has been induced by the acids formed by the bacteria on these surfaces, and which continue to harbor micro-organisms, thus causing reinfection, should be smoothed with fine stones in the engine, or what I use many times is a Scotch stone in a prophylactic polisher.

Before proceeding with the root surgery I might explain my method of obtaining the case history and making a physical diagnosis.

Before any attempt at treating the case I talk over the history of his or her condition with the patient. This information is jotted down on the history card, which I will pass around. You will observe that I take note of the local appearance of the tissues involved in the disease, whether there has been erosion, wearing or caries. I also learn the habits, usual diet, and the general condition of the health of my patient. I also direct the patient to bring a sample of a 24 hour specimen of urine for analysis. On the fly leaf of the history card, we note the temperature, pulse, blood pressure, result of heart examination, and make a test for hemoglobin with the Talaquest scale. In nearly every case we make a red and white blood count, and in marked cases of anemia, a differential count of leucocytes. If there is a marked flow of pus from the pyorrhea pockets we make a smear and examine for endamœba and bacteria.

We now have the physical data regarding our case and are able to make an intelligent diagnosis and a fair prognosis. Having carried out this method for some time I am convinced that in the majority of cases we have pyorrhea complicated with many other systemic conditions, notably auto-intoxication, acidosis, anemia and faulty elimination.

Perhaps the question might be asked, why go to all this seemingly unnecessary trouble, when it has very little influence upon the local treatment? It seems to the author that it is perfectly logical that our local treatment will be more permanent, with greater satisfaction to our patient and to ourselves, if the patient is in good physical condition. A great many pyorrhea patients may say that they feel all right, while if they be submitted to a physical examination, we undoubtly would find in the majority some of the conditions which I have mentioned.

Hopewell-Smith says that he no longer teaches that pyorrhea is a disease but that it is a symptom of disease. This to the author at present seems to be logical and in harmony with his observations. Right in this connection I might say that if we find on urinalysis a deficiency in the elimination of urea, or auto-intoxication with a high degree of acidity we prescribe for it; but if more serious conditions are in evidence we refer the patient to the family physician. The author believes that conditions of faulty elimination are best treated by the attending dentist, because if these cases are referred to the average physician they will more than likely receive less attention than they merit.

When we have made a physical diagnosis, carefully examined the mouth for contributing causes of irritation, and have polished the teeth as previously described, we are ready to attack the root surfaces.

In our discussion of the histo-pathology of this condition we stated that, when the fibers of the peridental membrane were detached from the cementum the latter had the power of holding micro-organisms in the crypts formed by the detached fibers. In examining sections of pyorrhea pockets from Talbot's studies it will be seen that the soft tissues are ulcerating, that the peridental membrane is destroyed to a considerable depth, that the cementum is rough and irregular, and no exposed bone shows in the pocket. These sections show dense masses of leucocytes in the mass of ulcerating tissue. These leucocytes are engaged in phagocyting the bacteria growing in the pockets, and as Hartzell has pointed out, this wall of leucocytes acts as a limiting factor in the spread of bacteria from the pocket to the general circulation. There is considerable space between the alveolar wall and the tooth root in these pockets, and the leucocytes do not readily cross the space to the cementum and phagocyte the bacteria growing there in enormous quantities. Applying the principles of surgery to these pockets, we see that the first thing is to get rid of this ulcerating mass of dead tissue, pus cells, dead peridental membrane, etc. Whether we use a plane, scaler or file in these pockets, we should have in mind the character of the tissue upon which we operate; in attempting to remove the necrotic root surface, if we carelessly cut too deeply we open the lacunæ of the cementum, and these root surfaces after a short time become reinfected, because of the lacunæ having been opened, and micro-organisms invade the protoplasm of the lacunæ and canaliculi of the cementum.

Let us briefly describe this type of root surgery. The rough infected coat of the cementum is more readily removed with planes having a two point contact and of limited cutting depth. The operator should begin at the gingival margin, and with short strokes plane off the necrotic tissue, gradually going deeper into the pocket until the root surface, denuded of its peridental membrane, is surgically clean.

The gangrenous peridental membrane presents the feel to the instrument of velvet or flesh, while if there is serumal calculus on the root, the feel will be the same as if passing the instrument over sand paper.

When the rough uneven coat of the cementum has been removed the surface will present to the instrument a waxy or old ivory-like sensation. If through rough instrumentation the root surface is planed too deeply and the lacunæ of the cementum is opened, the instrument will chatter as it passes over the surface. It is well to bear in mind that the surface to be removed is uneven, and that instruments that have concave and convex working bits as well as flat are best adapted for the work.

The operator brings away most of the debris from the pocket with his instrument, but if any doubt exists the pocket should be syringed out with a warm saline solution.

At the bottom of the pocket the operator will encounter granulation tissue. Hartzell states that this granulation tissue is made up of a mass of leucocytes which interpose between the bottom of the pocket and living tissue beyond, and serve to protect the living tissue from further incursions of bacteria, and also surround the obliterated ends of the vessels, which feed the tissue. The instrument should be pressed into this mass of granulation tissue so that every part of the diseased root surface will be removed, and also free the obliterated ends of the blood vessels. The author believes that when this granulating wall is broken down, we innoculate the patient with a good dosage of autogenous vaccin, and care should be used in patients who are below par, so that this innoculation may not result in acute disturbance with the production of pneumonia, mestatic abscesses, endocarditis, myocarditis, or acute joint infections. In the summer of 1913 I saw a case of Dr. Hartzell's, which developed a lobar pneumonia after a wall of granulation tissue equal to one and one-half square inches had been broken down at one sitting. This amount of work was done against Dr. Hartzell's advice, but as the patient was very anxious to receive the benefit derived from the root surgery as rapidly as possible, the Doctor consented with the above result. The pneumonia ran a classical course and the patient completely recovered.

The diseased tissue having been removed from the pocket and the cementum freed from its bacterial holding power, our next consideration should be: can we do anything to cause any restoration of the bony tissue which has been lost? In our discussion of the histo-pathology of this condition, we mentioned the work of Macewen whose experiments show that bone grows from the pre-existing osteoblasts. Applying this principle to the condition under discussion, if we can prevent general infection and give rest to the tissue, callus will be poured out by the bone cells and pile up for a variable distance against the root. The operator should freshen the edge of the alveolar process with an instrument. This also will open the obliterated ends of the blood vessels, and with the blood will also be an outpouring of callus; this formation of callus is for only a short distance on the root as the pressure of the tissues and the subsequent entrance of saliva and microorganisms into the pocket will prevent any marked restoration of the alveolar process. There is no restoration of the peridental membrane in this case, and the callus is right against the root; the condition is analogous to the relationship of the alveolar process and the root of an implanted tooth.

The pocket is now filled with a blood clot which is better than any drug that we might use. The blood clot acts as the matrix for granulation tissue to fill the pocket. Our next step should be to protect the blood clot from saliva, food debris and bacteria; many things have been suggested but I have not found anything better than a saturated solution of Merck's beechwood creosote and iodin, together with a saturated solution of tannic acid and glycerine, as suggested by Robin Adair. The number of teeth operated upon at a sitting are protected by gauze, and the solution of creosote and iodin is applied about a quarter of an inch down on the gums and well up on the necks of the teeth. This application is protected for a moment from moisture and then the glycerine and tannin is applied.

I find that wooden applicators such as are used by nose and throat specialists, with a wisp of cotton wound around the end, makes a very good instrument for applying these medicaments. When the saliva comes in contact with this preparation it forms a dark brown film on the gum; thus the pocket is effectually sealed for from 24 to 48 hours. This may be applied every other day for several times, in this way keeping the pocket free from infection.

After ten days or two weeks have elapsed and there is all the regeneration of bone that can be expected, I give the patient cotton rolls with a holder, as suggested by Dr. Skinner, and instruct him to massage the gums twice daily with an alcohol solution of the sulfocarbolate of zinc.

The formula as suggested by Talbot is as follows:

Zinc Sulfocarbolate	60 grs.
Alcohol	1 oz.
Distilled water	2 oz.
True oil of wintergreen	8 drops.

The surfaces of the teeth are kept clean by the use of fine powder, and flat ribbon floss is used by the patient on all approximal surfaces. Of course this does not take the place of the oral prophylaxis treatments by the dentists. The patient should have all surfaces polished by the dentist at least once every month or so at first, then as the resistance of the tissues increases, the time between treatments may be extended.

If there are pockets where the approximal gingival tissue is destroyed and there be a shelf of gum tissue which catches all the food debris, the gum is anesthetized with novocain and cut away. Following this treatment the author has noticed a new gingival margin to form.

A prophylactic measure which I have found very helpful is a rubber bulb syringe that will hold about one ounce. This is used by the patient to direct a stream of saline solution around the necks of the teeth, washing away food debris and an enormous amount of bacteria.

I have not touched on splints or bridges, as it is not within scope of this paper; suffice it to say that loose teeth should be splinted while under treatment, and in the author's opinion, no other than a removable bridge should be used on a pyorrhea case.

I have endeavored to give to you my conception of the etiology, prognosis and treatment of pyorrhea, as we understand it to-day. Tomorrow, research may alter to some extent our present methods of treatment and our ideas on etiology. Nevertheless we must not lose sight of the fact that it is the inflammatory condition caused by local and constitutional irritants and toxins that cause the absorption of the alveolar process and the exfoliation of the teeth.

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ELEPHANTS AND CAMELS IN U. S. ARMY

San Diego, Calif., April 15. Elephants and camels, carrying two machine gun sections of the Twenty-eighth Company of the United States Marine Corps, quartered at the Exposition here, took part in experimental maneuvers and quickly demonstrated the feasibility of their use in actual wareface conditions such as now obtain in Mexico.

Mounting one operator and tripod machine gun to an elephant, attended by several U. S. Marines on foot, the elephants displayed surprising agility in traveling over rough ground and wheeling into proper position for firing. The elephants, when ordered to lie down made a perfect breastworks, behind which the Marines were enabled in thirty seconds to employ an effective machine gun fire.

Both elephants and camels would prove useful in an extended campaign such as the present one in Mexico, an official declared, for both can carry large loads and can go long distances without water. Elephants are more nervous under fire than camels, but with proper training they can be cured of gun-shyness.

PROFESSIONAL EFFICIENCY—EDUCATIONAL, PHYSICAL, FINANCIAL.*

BY G. E. HARTER, TOLEDO, OHIO.

SUPPOSE, said Thomas Huxley the great English scientist and author, "Suppose that it were perfectly certain that the life and fortune of every one of us would, one day or other, depend upon his winning or losing a game of chess. Don't you think that we should all consider it to be a primary duty to learn at least the names and the moves of the pieces? Do you not think that we should look with a disapprobation amounting to scorn upon the father who allowed his son, or the State which allowed its members, to grow up without knowing a pawn from a knight?

"Yet it is a very plain and elementary truth that the life, the fortune, and the happiness of every one of us, and, more or less, of those who are connected with us, do depend upon our knowing something of the rules of a game infinitely more difficult and complicated than chess. It is a game that has been played for untold ages, every man and woman of us being one of the two players in a game of his or her own. The chessboard is the world, the pieces are the phenomena of the universe, the rules of the game are what we call the Laws of Nature.

"The player on the other side is hidden from us. We know that his play always is fair, just, and patient. But also we know to our cost that he never overlooks a mistake or makes the smallest allowance for ignorance. To the man who plays well, the highest stakes are paid, with that sort of overflowing generosity which, with the strong, shows delight in strength. And one who plays ill, is checkmated—without haste, but without remorse."

The vast majority of mankind go into this game, as all must go into it whether we will or no, without even the most rudimentary knowledge of its rules, to say nothing of the kind of headwork and footwork that goes to make up the finesses of the great game. And, of course, most of us are checkmated and removed from the board long before the game becomes interesting; the great number without having learned anything at all, seemingly, since the latter stages were played with quite an equal degree of ignorant heedlessness as the first.

It is little wonder that the bugaboo of heredity dies so hard in most minds, since some reason must be sought to account for the early and complete, or later and just as sure, triumph of the unseen antagonist, by whom every move is made with unerring sagacity and skill—as is quite to be expected upon the part of one who devised the game and made its laws.

But, some day, that bugaboo is going to become known for what it is, as it now is known by the wise, nothing more than an excuse for inefficiency, for lack of knowledge of the rules of the game, and, still worse, for simple indolence in preparation. By preparation I do not mean simply preliminary schooling, but to a far greater extent, that development leading to continuous education, the lack of which marks the pathway through life of by far the great majority of us.

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*Read before the Northern Indiana Dental Society, 1915.

In an able paper read before the Panama-Pacific Dental Congress by Dr. L. L. Barber, of Toledo, the education of the dentist is divided into two parts or periods, Preliminary and Professional, and the author pleads for the more complete development of the first part, making the point that all that the dentist ought to be as a man, as a leader in his community, apart from his avocation, should be gained before entry into the dental college. While fully agreeing with Dr. Barber, so far as he goes, my own position is and has been since my first acquaintance with the profession, that both preliminary and professional education, technically, as such, should be regarded simply and solely as a beginning, as a commencement, in the true sense of that word, and that the education of the dentist should be continuous and progressive, limited only within the confines of life.

Please do not misunderstand me. By the word "Education" I mean something far other and far different than the meaning usually assigned to that much-abused word, merely a sort of stuffing, or at best a mere superficial dressing. When I use the word I wish to be understood as expressing its simple and primary meaning—a drawing out, developing, expanding of all that is in the man.

Now, nothing is more certain than that present methods of education do not accomplish the purpose at which they are supposed to be aimed, resulting, at best, in the production of a mere knowledgeous animal, rather than in an educated,—developed, drawn out,—Spirit; therefore, if any man hopes to be considered as truly educated, there comes no moment in his life when his education may be said to be completed; the game must go on until the last move is made, ending either in success or defeat.

Education should have wisdom for its goal, not mere knowledge; and wisdom is knowledge in action, knowledge applied to life and the purposes of life.

A few weeks since I asked a friend of mine what in his estimation was the greatest thing in the world. His reply was: Progress, Success. A very good reply, you will say, but not quite in agreement with my own. Suppose you ask a ship captain that question with regard to the navigation of his craft. Taking progress altogether for granted, as the one aim and purpose, he probably would consider the thing that adds most to power, certainty, safety and speed as the one most important factor. Make progress we must and do, in one way or another, and at some speed through the world; but to make that progress definite, toward a well-ascertained end, requires something more than the boat, something more than the mere machinery of our craft. Sailing round and round in a circle is sailing, of course, but the farther shore grows no nearer; and, unless there is ample *power* behind the screw, and unless that power is continuous and increasingly manifested, we shall most certainly never arrive. And, as Neitsche says: "Unless we have in life a well-defined purpose, some goal toward which we constantly steer and strive, we may as well sing the doxology, pronounce the benediction and dismiss the congregation, for we shall get nowhere."

Knowledge may know a great many things; wisdom does them. Knowledge may know that certain actions ought to produce certain results; wisdom produces them. Knowledge is simply a warehouse full of supposed facts, that may be upset tomorrow and rendered nugatory by later discoveries. Wisdom makes its own discoveries as it goes along, draws its own deductions and conclusions, and straightway applies them to the necessities of life.

Of course, we might go on in this way, pointing out differences and similarities, for as many hours as any of you would care to listen without getting anywhere, without touching or even approaching one single practical fact that might be applied to daily living. That sort of thing, in my thinking, would fall under the old newspaper category: "Interesting, but not important, even if true." Such writing is not at all a part of my purpose; quite otherwise. If everyone of you does not go from this meeting with something practical in his bonnet, it shall be no fault of mine; and by "practical" I mean something that can be applied, used, put into operation, made to work, to produce results, every day and every hour, not only in your daily work, but in the affairs of life, generally considered.

Education and the methods of education while often confounded are not one and the same thing; one is the result of the other. One is the effort to draw out, develop, and the other is the developed mind, not, mind you, the stuffed mind. In my estimation the educated mind is not at all like a mango, stuffed with chow-chow, but a mind keenly alert, alive to every stimulus, ready to contact and absorb every new fact, and make it part of the energy of life, of ability in the playing of the great game.

In the process of education, two factors always are pre-supposed: Impact upon consciousness from without, stimulus, and response to such stimulus from within. One without the other is as useless as music to the deaf or the colors of the rainbow to the blind. Dead men respond to no stimuli; dead minds are deaf to all appeals.

Some people are defective optically; we say that such men are color-blind, cannot distinguish colors; and this means simply that they cannot respond to certain stimuli conveyed to the optic nerve along etheric waves. Of course, the same impact, the same vibrations, the same etheric rays, fall upon the eyes of such people as upon the eyes of others; the impact, the external stimulus, is not lacking; but their responsive faculties are atrophied or asleep.

Now, the one proper purpose of education should be to awaken response, to draw out, to develop, unused faculties within. Education that fails in this, fails in its purpose, leaving its victim stuffed, perhaps, but utterly useless as a factor in the life of the world.

If some way might be discovered by which those interior faculties could be awakened, drawn out, developed, unfolded, the long, slow, stuffing process might be greatly shortened, and the weary, dreary, almost useless years of preliminary preparation reduced to the minimum, while the result attained would be very much more satisfactory. The difference between a mind loaded with dead and useless facts almost to suffocation, and another mind, keen, wide-awake, stripped for battle, is too apparent to need comparison. In the latter case we would have a mind fully alive and awake, capable of instant response to every impact, able to interpret every circumstance and experience of life truly and completely, a mind with teeth in it, capable of biting every proposition to the bone, and drawing therefrom power for use in the battle of the world.

Just such a process has been discovered and is in actual use today. Many a man who stands head and shoulders above his fellows, owes his advantage to just that sort of training. Many men who are regarded as vastly superior to other men in natural endowment or qualification, owe that superiority not to native, natural genius, but to the application of some simple rule of training, of education. How often do we hear of men who, from mediocre or less than average school-days, pass into history as the most successful men of their time? Thomas A. Edison must have shouted with laughter many a time upon hearing or reading praises of his native genius, knowing well that every atom of his great success is due, not to genius, but to application, to the training of every faculty to its utmost capacity.

Lord Kitchener, the great man of England, puts into practice, I am told, every day of his life, some or all of the rules I am about to lay down; and, if the truth were known, we should all be surprised to know how many great scientists, financiers, surgeons, what-not, daily practice these simple exercises in the development of nerve centers of response, in order that they may bring into their work the necessary keenness, acumen, interest, and derive therefrom the pleasure and stimulus needed to prevent life becoming an unendurable burden, a mere weariness of soul.

Now, please pay attention; I am coming to the practical part of the matter, the meat in the cocoanut. All impressions, impacts, stimuli, from without, reach consciousness through some one or more sets of afferent nerves. As we say, such impressions reach us through the physical senses; although that the senses are not at all physical is now well known to the wise, and soon will be known even to the "educated." These lines of communication between consciousness and the outside world of things are said to number five, although you and I and everybody else knows that there are at least seven of them. However, let us suppose that they are but five, and let us also suppose that the Self is a prisoner shut up within the body, having no other means of contact or communication than through these five senses. If a prisoner in the conventional sense, shut up in an underground cell, had five lines of communication with the world of free men, I would not need to ask you what he would do with them. You know that he would care for these wires as a mother cares for her child, or as a miser cares for his gold. Nothing would be neglected to keep them in the finest working order, in the very height of efficiency. Yet each of us is such a prisoner, and how few of us do anything at all toward the preservation of our lines of communication. How many of us seem bent upon their destruction. At any rate, we live as though we had no interest whatever in them, shut up within the little, narrow, pent-up shell of the body, only half alive to sights, and sounds, and odors, and other sensations that ought to mean much to us, and yet pass over the heads of most of us as though they were not.

Sight, hearing, touch, taste, smell—these are simply varying states of consciousness manifesting themselves through the body, but varying methods of the one faculty of perception. They are the antennae of the Self, the avenues through which all external impacts or stimuli are carried inward to our consciousness, and, of course, upon their development and training depends our reactions, our comprehension of the rules of the game.

Most of us neither hear, see, touch, taste or smell more than a very small part of the world in which we live. The great difference between the artist and we poor, ordinary mortals, is that he perceives, in one way or another, a hundred or a thousand times more than we do; his perception, operating through the avenues of sense, is far more alive, awake and at work.

Now, it has been demonstrated over and over again that there is little or no difference between men as they run, so far as natural endowment is concerned. One of the greatest scientists along the lines of psychology says emphatically that every child has within him potential powers capable of being developed that will make him the equal of any other. What, then, is the difference between the artist in life and the mere plodder? So far as I am able to see, the sole difference lies in *application;* training; making the most or the least of what one has.

I am here to lay before you the results of hundreds of experiments, believing that many, at least some, of you, are quite capable of systematic application, once you know the rules of the game. If you gentlemen will accept these instructions and apply them, there is not a man of you that will not say at Convention next year that it is the greatest thing he ever tried. That you would not go back again for anything short of an independent fortune, having which one might afford to be a dolt.

One of the principal avenues through which stimuli or impacts reach our consciousness is that of hearing. It is the one sense most easily developed. And it is easily safe to say that not one man in ten thousand hears anything near all that he ought to hear, of running the entire gamut of possible sound vibration from eighteen beats per second to forty thousand per second. I have known but few men who had developed this sense to its limit, and one of them was blind. In blind men, all other senses usually are developed far beyond the average, particularly that mysterious sixth sense, of which I spoke a while ago. Of course, there is no reason why this need be so and I mention the fact merely to emphasize the statement made above that all men possess the potential power of much greater than average development.

I suppose very few of you have any idea that mice sing. But they do just that. It is not the fault of the mice that the hearing sense is so poorly developed in the average man that all he can hear is their squeak.

How shall the sense of hearing be developed, opened up, educated? It is all a matter of attention, of application, and results follow with almost amazing rapidity. Simply set aside a few minutes of the day or evening and reserve them religiously for practice.

First: Take your watch in your hand and place it to the right ear, listen attentively until you get the ring and rhythm of its tick. Now, move it a few inches from the ear, straight to the right, listen again until you hear it fully; move it further and listen again. Finally hold it at arm's length. Repeat this until you can hear the ticking as well at a distance of the length of your arm as when held directly against the ear. Then the same on the left side. Few right and left ears really are mates, usually one or the other is the more acute. This condition produces what might be called auricular astigmatism, the result of which is to confuse all sounds, making perfectly clear definition and location impossible. If you find that you hear the ticking of your watch more distinctly with one ear than the other, work on the weaker of the two until you bring it up to the standard of the other.

Now, place the watch on desk or mantel and stand about three feet from it. Listen first with one ear, then with the other. Stand right there and listen until you do hear the tick distinctly with either ear. Then move away a step and repeat the process. Notice the distance at which you cease to hear the tick, and stand just inside that limit until it is perfectly clear. Then continue the process. If you find that you can hear at the distance of, say twenty feet, you may be encouraged to know that you are far beyond the average. I have known men who could not hear the tick at arm's length; but I also have known a few who could hear it at a distance of 100 feet. Continue the practice daily until you can hear the tick of the watch in your patient's pocket when he enters your office. Of course, the idea is not to hear the ticking of watches but by the time you are willing to stop practice you will have learned to hear so many other things that you will wonder where you have been living all these years. Pay attention to every sound that you hear. Listen! Listen! Try to distinguish the different instruments in an orchestra; and this is a very interesting practice. You soon will find yourself able to hear just those sounds that you want to hear, to select, for instance, the first violin and follow it through the entire piece as distinctly and separately as though the performance were a solo.

Another very fine bit of ear training with the watch is to have somebody place it anywhere in the room without your knowledge, then close your eyes and find it by ear alone. When you have located it try to place your hand directly upon it without groping about.

On a crowded street select some particular vehicle and endeavor to hear its noise only, shutting out all other noises.

Many other experiments for practice are sure to suggest themselves to any who earnestly endeavor to improve this important sense.

Very few people see all that there is to be seen and just as few see things as they are. I once listened to the testimony in a damage suit for personal injuries sustained by a street-car passenger who was struck by another car as he passed around the rear of the one he had quitted. Hardly two of the witnesses agreed as to the direction in which either car was moving at the time of the accident, although each testified under oath that he had been standing within a few feet of the car when it occurred.

How many of us, seeing an automobile pass, are able to state positively its size, color, number of occupants, or give any other detail correctly? To practice this and other experiments of the kind is most excellent training for the vision. Of course the secret of this and all other progress is *attention.*

Try this: Take any object—a penknife, scissors, forceps, and place it before you. Look at it intently for a few moments and then try to write a description of it, giving size, weight, shape, color, material used—anything you can think of to say about it. Then compare what you have written with the object itself and you quickly will see how far short you have come of really seeing the object looked at.

When out of doors, look at a tree or other natural object, and go over it point by point, as though you expected to be questioned concerning it.

Take the spot cards from the ace to the ten, out of a deck of ordinary cards. Shuffle them, face downward, then turn up a card and merely glance at it, don't try to count but try to see instantly how many spots there are on it. Drop it face down and then try to count the spots as you see them in memory. Write down your idea. Then go to the next card and so on through. Now turn over the cards and compare them with your memorandum. At first, you will make many mistakes, but you will be surprised at your progress. Remember that professional gamblers practice such exercises for months, sometimes putting in ten solid hours every day. They become so expert, the eye and the mind are so perfectly trained to work in unison, that even the slightest variation in the marking on the backs of a pack of fifty-two cards is instantly detected.

One part of the boy-scout training is to send a group of boys through a piece of woodland or a city street and report everything seen. One boy will see nothing but grass and trees, or vehicles, houses and people. Another will be able to describe everything minutely.

Last of all, and of course, most important of all, study humanity. Every man carries in his face an indelible record of what he is. The trouble is so few of us ever see the record, much less study it, classify and analyze it. If you will practice these things for only a few months you will wonder that you had lived so long in the world without seeing it.

Very few animals are so poorly equipped with the sense of smell as is man—and yet most of us no doubt remember how acute was that sense in childhood. I personally know of those who could select, in a dark closet, any article of clothing belonging to any member of the family by the faint odor hanging about it. I remember when a child at school that a scholar refused to sit in the same seat with another because his odor made him ill. I know a lady who usually can recognize articles belonging to acquaintances by odor alone.

Many a fatal error would have been avoided had the sense of smell been even fairly developed in the victim. For instance, no one ever should be able to mistake bichloride tablets for quinin, even in the dark. Every dentist should have the odoriferous sense well developed. Chemists depend upon it largely in analyses, and there can be no doubt of its value as an aid in diagnosis.

This sense is very easily developed by simple practice. Put into ordinary pill boxes small quantities of cinnamon, cloves, red and black pepper, mustard, sugar, ginger, salt, rice and peas. Learn to name each article instantly by odor only. Practice while blindfold, of course. Then learn to distinguish lead, zinc, gold, brass, copper, steel, mercury, etc., in the same manner. Put small quantities of oil of cloves, wintergreen, lemon, verbena, citronella, cedar, lavender, peppermint, bergamot, nutmeg, cassia, etc., into vials and practice in the same manner. Make careful note of the odor of various flowers, shrubs, weeds, mushrooms, etc., for future reference.

Taste and smell are full cousins, if not brother and sister. Prove this by trying to taste anything while holding the nostrils closed. You know how tasteless is the finest cigar when your nares are closed by inflammation. However, there is a way—but one way, so far as I know—in which the taste may be very greatly developed and that is to follow the instructions I gave you years ago concerning diet. Eat only simple foods, with very little salt, sugar, mustard, vinegar, pepper or other condiment. Dopes of this kind quickly destroy the sense of taste. Nobody who is in the habit of eating large quantities of salt and pepper, for instance, can really taste a strawberry, or any other fruit having a delicate flavor.

The tactile sense is usually very well developed among dentists yet a little practice will very greatly improve it. No special instructions need be given. Simply note the texture of everything you touch, from sandpaper to silk floss, its temperature, etc., paying attention to it at the time. Practice on grains of salt, sugar, emery, flour, talcum, rice powder, shot, etc. Few persons can distinguish the different sizes of shot by the touch only, yet this should be easy.

As an adjunct to the sensory battery stands memory, the greatest faculty of men. Huxley says that the one thing that distinguishes man from the animal, lifts him high above every other organized life, puts him into a class altogether by himself, is *memory*, and memory only. I find in a book of ancient proverbs this: "By so much as a man remembers, by so much is he a man and not an animal."

Every one of the exercises given for sensory development will be found to react upon memory, very greatly to its advantage and improvement.

Carlyle and others say that attention is the greatest factor in memory, and there is no question that we remember longest and most clearly those things in which we are most interested, which demand our closest attention. And Caryle defines *attention* as a "stretching toward, an enveloping." All of the directions given, if followed, will very greatly increase our capacity for attention, interest and make life very much more worth while. Why, you old, worn, blase pilgrims, just think what it would mean to be *really interested* in every fact of life! I knew one such man, Dr. M. H. Fletcher, of Cincinnati. I have taken walks with him, in the country, along the beach, and at every step he found something to interest—a pebble, a leaf, a twig, a flower, a shrub, a cloud, a tree—the world to him was very much alive, and literally choked with things to interest, instruct or amuse.

However, the memory is capable of very marked improvement and development, and responds with surprising rapidity to a very little training. Here again attention is the *sine quo non*. Read a line in a book or newspaper. Close the eyes and repeat it aloud. Then read that same line and another. Close the eyes and repeat both aloud. Then another and another and another until you can read a paragraph or a page and repeat every word correctly.

Notice vehicles that pass you in the street. I know a boy who can tell you the maker's name of every auto that passes him. Notice their color, kind of wheels, etc., and then try to describe them to yourself. Notice the number of occupants—men, women, children; how many of each, old or young, how dressed, their faces, etc. Try this once or twice a day for a week or two, and you will find yourself able to recall the name of every patient as soon as you see his face. Then try shop windows as you pass them. Try to take in everything at a single sweeping glance. Walk a block, turn and walk slowly back, making a mental list of everything you saw. Then look again carefully, checking your mental image with the window itself.

In reading a book stop frequently and tell yourself the story in your own words to the point where you left off reading. Make strong mental pictures of the scenes and incidents, described by the novelist or essayist. Do not try to repeat his words—just the sense of the story in your own way. Then try to write it out.

Hard work? Well, just at first; but, hully gee! what do you fellows expect for nothing? Self-development does not come done up in packages at five cents per box.

When I was a boy, more years ago than I care to think about, imagination was considered a detrimental quality in all save the poet and the novelist, especially so to the business man who was supposed to be particularly and wholly "practical;" "hard-headed," was the word, meaning stupid, mostly. Nowadays it is well known that the man without imagination, without vision, has no place in business except, possibly, at the desk of the bookkeeper. As a matter of fact, a vivid, active imagination is one of the greatest personal assets it is possible for a man to possess, no matter what his walk in life.

Among the other fallacies of an outworn age is, that imagination is an innate quality, an endowment which some men possess naturally just as some men have red hair and others none and that if a man had it, why, he had it, and if he didn't there was an end to the matter. Modern experimental psychology has proved that this great power may be acquired and cultivated just as surely and a great deal more easily than a knowledge of geometry or Greek.

As a simple matter of fact very little of all that has been done toward the advancement of society could have been done without imagination. As one writer says: "Without imagination the world would be barren. Not merely would there be no pictures, no books, no music, but there would be no houses, no bridges, no ocean greyhounds, no great business enterprises; for everything that man has made has been conceived first in the imagination before it was born in actual being."

Kant, the great German philosopher, says: "The universe is, to man, but a projection of his own inner consciousness."

While many men are sadly deficient in this great power, none are entirely without it, at least rudimentarily. If a man were wholly without it he would be of little use in the world. Of course such a man might be honest, conscientious, industrious and all that, but never need he hope for a prominent place in any profession or business nor even a mediocre position in either.

Of all our powers none are so easily cultivated. I account for this in my own philosophy by concluding that it is the one fundamental quality that makes us what we are. Our lives may be ordinary and humdrum; we may so live as to bury our imagination under a mass of Grad-grinding facts and opinions, but still it is there and may easily be revived and brought into useful activity. Of course the cultivation of the image-making faculty brings with it the development of all the other powers of the mind.

Many people consider the activity of the imagination to mean the production of something entirely new in the world. This is not at all true. In the first-place there is no such thing as an entirely new thing or thought, nor is it possible to produce such a thing. "There is nothing new under the sun," as Solomon said—No, nor in the sun, nor beyond it. Even the man who wrote:

> "I never saw a purple cow, and never hope to see one;
> But I can tell you, here and now, I'd rather see than be one,"

merely combined the ideas of a color, a cow, and the condition of seeing and being to produce a new form, a new stringing together of old conceptions expressed in old words.

The raw material for every act of the imagination is aroused within us by the things about us that we perceive—that are carried to our consciousness along the avenues of the senses that we have been talking about. In fact it is just the power of imagination that enables us to respond at all to external stimuli; and the more completely alive and awake is that power the richer is our response. The plowboy may see nothing in the setting sun except the close of a day's toil; but that there is much more than that to be perceived in it is evident to all who have read much or who have communed much with themselves.

Every act of your life is the outcome of the activity of this faculty. All you need to make this a wonderful aid in all your work is a little of the proper kind of exercise. Try this: Whenever the idea of doing anything at all occurs to you, immediately form in the mind a picture of the thing to be done and of yourself doing it. Fill up every detail of the picture.

Suppose you are about to hurry home and dress to catch a train. Begin the picture with your entrance. See yourself removing your office clothing, piece by piece, slipping them into or onto their hangers and placing each on its proper hook. Remove your watch and place it where you cannot possibly overlook it. Select the shirt you mean to wear, place buttons and studs, and hang it in a convenient spot—not just drop it down anywhere. Be sure to see your hands and fingers doing the work. Paint with a fine brush: not as though you were whitewashing a fence. Turn on the bath, temper the water to suit, remove underclothing, put in laundry bag or chute, have your towels ready and plunge in. Then the shave—lathering, stropping—just so many strokes on each face of the strop—then shaving—now into the underclothing—no haste but no rest—select collar, tie, pin—the whole thing; follow the job through. You will find the picture not only very interesting, but immensely helpful. You are planning the work and what is more important you are suggesting to every organ and cell of the body just the part it is to play, preparing it to do its work quickly, accurately, without blunder, in the minimum of time, with the least possible labor.

Work out, in the same way, every detail of a piece of mechanical dentistry: See each part of the work in its own proper place. Go over and over it until you can see the entire picture from impression to—collection.

If you ever go to the movies forget that you are looking at a certain number of vibrations per second. Do not see the screen at all. Simply live through each succeeding scene as though the mimic panorama were alive and you were a part of it. On the way home reconstruct the entire story, imagine the motive behind each act and its probable consequence upon all concerned.

When reading a story forget the paper, the type—every mechanical part of it, and see only the pictures the author is trying to describe; live them. Read a page, form the images described, close the book and go over them again.

Dozens of other exercises will suggest themselves, and you will soon find yourself living a new and most interesting life. No fear that such work will load the mind to the point of repletion and fatigue. The mind loves activity and grows upon it. Everything you have to do will appear in a new and vastly more entertaining light, and some of the burdens now resting so heavily upon you will melt like the proverbial snowball in the regions presided over by his satanic majesty.

Just one other hint: At the close of the day when, with slippered feet and body relaxed, you may take your ease, go over the work of the day, point by point, beginning with the last thing you did and forming pictures of every motion of hand, feet and body. Recall the conversations with patients and friends; recall the words, gestures, every possible detail. Do not *think* the *words* that describe the acts but form pictures of the acts themselves and *hear* the words.

If anything has gone wrong during the day review your acts and words and see if you could not have avoided the trouble had you been a little more diplomatic in word, tone or act.

Do not, at first, attempt to review the entire day. Fifteen to twenty minutes is quite enough. As in the case of muscular exercise, one should begin moderately, not carrying the work to the point of fatigue. I may say that this is the method followed and taught by the great Grecian philosopher and teacher, Pythagoras, whose influence upon the thought of the world grows no less as the centuries go on.

Please remember that every sense has its own image-making power. There is visual imagination, auditory imagination, gustatory, odoriferous, and tangeriferous imagination, and then, greatest of all, there is the imaginary imagination, in which the action is purely metaphysical, in which the student may, as it were, imagine himself to be imagining. In that state we see, feel, taste, hear and know without physical stimuli; this is the truly creative state of mind, in which Euclid, the father of geometry, imagined himself to be when he said: "O, Jove, I am thinking thy thoughts."

I think I have not mentioned a word that is very much in the mouths of some people these days—concentration. I hear very much about this thing on every hand. But, although I have not mentioned the word, every suggestion made has reference to it. I have found that the surest way *not* to cultivate attention and concentration is to think and especially to talk about them. Do these simple things and you will find the power growing daily. You will become marvels of concentration before you know it. The natural state of the mind is activity and not rest.

In this world much if not most depends upon a sound body. "*Mens sana in corpore sano*" seems an ideal now much further beyond the reach of the average man than it was when Juvenel prescribed it for his countrymen hundreds of years ago. You dentists spend your lives in efforts to conserve organs intended by nature to preserve the health and add to the strength of the body, and yet you must know that not only your patients but many dentists themselves are consistently, patiently and persistently "digging their graves with their teeth."

There is not the least particle of use in my going again into the subject of diet and general physical hygiene with relation to physical efficiency. I still think as I thought and speak as I spoke several years ago on this most vital subject. Most men prefer to continue to feed the palate rather than the cells of the body, even though they know the consequences. Therefore, I will touch on this point very briefly.

Eat simply: very little meat; as little salt as may be; no soggy bread, better toasted; plenty of eggs, raw are best; abundance of good vegetables and fruit; exercise abundantly; sleep with all windows open wide, a sleeping porch is better. A hot bath at night, a cold shower or sponge in the morning; air baths; deep breathing; punching bag; long walks and a good conscience; these will help some. If you want to live to be a centenarian, and are willing to pay the price, let me know.

Of course everybody knows that dentists are poor business men; just how poor only a man coming into the business, after years of experience in other pursuits, is quite competent to judge. Those who have made the practice of the profession or the purveying of its necessities a life-work have become inured to its difficulties and peculiarities. But to one who, like myself, comes into it from other lines and finds such a provision as the old 11 per cent. and the new 5¼ per cent deposit discount, and find that it is taken advantage of by the merest handful--well, the matter simply is amazing. Why, in other lines a man who would not seize such an opportunity would be considered irresponsible and not entitled to credit at all. Let us see just what a deposit account under the present conditions would mean—does mean to the few who take advantage of it.

Suppose average purchases of a dentist run $100 per month. A deposit of $95.00 on the first of the month pays the bill, leaving $5.00, 5.25%, of his investment in his hands. This is no part of his earnings or capital, but actually is a bonus *paid him* by the dealer for his simple good will. Let me tell you that if every dentist took advantage of it, the dental trade soon would be obliged to withdraw the privilege. In twenty months you would be buying your supplies with the dealer's money; you wouldn't have a cent invested. If your purchases averaged but $50 per month, the result would be the same in 40 months. If you deposited your discount in the savings bank at 4% the time would be still further shortened. Will some of the brethren kindly show me how I can secure any such returns—100 per cent gain in 20 months?

Yes, dentists and doctors are poor business men. Confidence men and blue-sky artists find them easy picking. They are second only to preachers and just a little ahead of school teachers in the avidity with which they buy fake mining stock, oil well shares, and bonds of the Sumwatah Medicine Co., Limited—and yet, when a strictly legimate proposition comes their way, such as frequently offers itself in the experience of the average business man, they are as skittish as country-bred colts, and can no more be counted on to invest than a Ford to win a race up at Indianapolis next Spring.

A friend of ours, a splendid dentist and a royal good fellow, died up in Michigan not long ago at about forty years of age. Nothing especially peculiar about that. So long as dentists feed themselves as the unthinking do we must expect such an early end to many of them. The peculiar thing is that his friends and neighbors had to chip in to pay the cost of his funeral. There wasn't a dollar to the credit of his account anywhere on earth. Later on, the friend who undertook to close his "estate," or non-estate, rather, found worthless papers in his safe representing a net investment of more than $40,000. He had, that very month, remitted payments of a sufficient amount to have more than paid the expenses of his burial—and I wonder how many there are in the profession who are listening to the song of the siren.

At Boston last March I asked half a thousand New England dentists how many of them knew the total gross receipts and expenses of their practice during 1914. Just six raised their hands. Then, how many of them knew the proportion of cost to total income: the same six. Then, how many knew how to keep their own accounts properly: same old six.

The greatest single factor in the business world is credit; the second is also credit.

The wise man builds a credit; then his credit builds him.

Some dentists make a big stew about paying drafts through bank. Why, that's the surest and quickest way to get a credit at your bank. Let the drafts come; meet them on the minute and other things being equal you'll find yourself able to borrow money at that bank should the necessity arise. Banks loan money on character, and character rests on credit.

If I were a dentist, I should "talk it over with Katy," tell her how much I was earning, and agree with her how much salary I could afford to pay myself next year. But I'm not, and so you must do it in my stead. Then deposit your receipts every day—not in your pocket, or an old sock, nor an empty tomato can, but in your bank. Deposit it in the name of, say, "J. C. Jones, Dentist." Once a month let "J. C. Jones, Dentist," draw a check payable to "J. C. Jones," (personal), and let J. C. Jones deposit that check in another account in the same or another bank. Then let J. C. Jones draw a check once a month to "Katy Jones" for the amount agreed upon to "run the house." See that Katy deposits *her* check, in her own name, and that she pays rent, groceries and all other bills over $1 by check—and let *her* "run things" so far as household expenses are concerned.

Run your business as a business, not as a peanut stand. Pay your rent, material bills, fire insurance, repairs, renewals, etc., by check against the account of "J. C. Jones, Dentist," holding your *personal* account for personal expenditures—clothing, living, etc. Petty expenses of the business should be paid out of a petty expense fund, replenished when necessary by drawing checks against the account of "J. C. Jones, Dentist." Do not pay out a penny of your receipts until it has passed through bank.

You may think you know how to save money, but you don't unless you run every dollar you take in, in a business way, through a bank account.

You need not keep an accurate account of your personal expenses unless you care to do it. Do what you please with your salary, but do *not* *exceed it*, even though your receipts double during the year. At the end of the year, take stock carefully, decide what you are worth, whether you are gaining or losing, and make your salary for the following year depend upon your net worth and average receipts for the past year.

If you find a satisfactory balance, you may draw a check to "J. C. Jones" for as much as the business can spare, deposit it in your personal account, buy a home or a motor or do anything you like and Katy Jones likes, or invest it in something that has at least a chance to bring in fair returns.

Don't buy mining stock.

Don't buy oil wells.

Don't invest with anybody that is unknown to you.

Don't invest in *anything* that promises 40, 50, 60, 90, 100 per cent. dividends. You will find such things all *promise*.

Don't buy anything because it is "cheap." A thing you don't need is dear at any price. If you do not already know that the supply-man is your best friend, it is time that you found it out; best friend that is in a business way. Of course he isn't going to go broke to accommodate you nor pull you out of a fire unless he can do it in perfect safety, and if you insist upon drowning yourself, he, very probably, will let you do it rather than have a fuss with you about it. But he is your friend just the same, your interested friend because, of course, it is to his interest to be just that.

I suppose fifty dentists have voluntarily told me that if it had not been for the friendship and kindness of Mr. Randolph, one of the founders of the house of The Ransom & Randolph Co., they would have been unable to get so much as a start. On the other hand not a few of them have just as voluntarily told me that they never have bought a dollar's worth of goods from any other concern since beginning practice. These are good things to hear, good things to know. Ten, twenty, thirty, forty years of friendship and good will mean quite a little on both sides; for, let me tell you, the human touch is still the greatest thing in the world, let him who will say the contrary.

If you need credit, as most of us are sure to do, just go to your dealer and frankly tell him all about it. Tell him what it is that you want; tell him how much accommodation you want; tell him when you want to pay and how you want to pay. If he wants you to sign notes, sign 'em; when they are due pay 'em, and don't think you are incurring his everlasting obligation by doing it. The obligation is all on your side. The goods are his in the first instance, and he could have refused to turn them over to you except for cash had he so elected. A note is a business accommodation to the man who signs it, and let that sink down into your mind and stick. The dealer has every right in the world to expect you to pay those notes. If you find that you cannot pay one of them, write to the dealer at once and tell him so. Tell him also when you think you can pay it, don't just let the thing run along without a word of explanation. Don't get the idea into your heads that because you have signed a note and handed it to the dealer that your obligations are at an end. They have just begun. If you permit one of your notes to run beyond the time when you agreed to pay it, and say nothing, what is your friend the dealer to think? What is he likely to do in order to protect himself? He dare not ignore the matter, as you have done. He must do something, and you have no right to complain no matter what he does.

Another thing: Whatever the dealer does or does not do about that note that you do not pay when due and that you do not write to him about until he has done something that you don't like, whatever he may feel called upon to do, whether you like it of not, he is still your friend, still ready to do anything that he can do for you, providing you act like a business man in the matter and don't indulge in a personal grouch about it. To the dealer, you and your business are two different beings, just as, in his thinking, himself and *his* business are two separate persons. He may like you and dislike your business methods, and I hope the time may come when we can tell each other these things without raising a rough-house about it. The only reason that we cannot do it now is that personal conceit cuts such a large figure in our make-up. We think that unless a man considers us perfect in every way, that he is no friend of ours and proceed to do him up if we can.

I wish every one of you would read the paper read by Dr. Gillis last year as his presidential address. It has just been printed—September—in THE SUMMARY; and heed as well as read. Evidently Dr. Gillis had just spent a lot of money for a new outfit, and was feeling pretty chesty about it. Anyhow, he told the truth, truth that nobody except a dentist or an M.D., would need to be told. See that your office outfit is the best, most attractive, most artistic, and the least like the conventional doctor's shop as you possibly can buy. I do not believe in extravagance, but I most emphatically do believe in wise investment. That's what money is for.

No man thinks more poorly of the spendthrift than do I. There is just one man that I consider less worthy of esteem and that is the "tightwad." Then there is the happy medium, with apologies to our friends the spiritualists. To my mind there seems to be but one method by which expenditures may be sensibly measured, and that is upon the basis of real value. Always get one hundred cents in value *to you* for every dollar you spend, and be the judge of that value for yourself. Do not get into the habit of buying things just because other people do; don't think you are behind the times if you don't eat oysters every week during every month that has an R in its name, just because other people do. Don't care a rap whether you are in the fashion in your expenditures or not. Always live within your means. As Mark Twain says, you can't very well live without it.

HERE ARE JEFFERSON'S TEN RULES.

Never put off until tomorrow what you can do today.
Never trouble another for what you can do yourself.
Never spend your money before you have earned it.

Never buy what you don't want because it is cheap.

Pride costs more than hunger, thirst and cold.

We seldom repent of having eaten too little.

Nothing is troublesome that we do willingly.

How much pain the evils have cost us that never have happened!

Take things always by the smooth handle.

When angry, count ten before you speak; if very angry, count ten hundred.

Here's another little bit of advice, just thrown in gratis, like the rest. Until you have trained yourself to the point at which you have entire confidence in your business judgment, never invest any considerable amount without consulting a banker, or a business friend in whom you have confidence. If you do not care to talk over such matters with any friend in your own town it wouldn't be a bad idea to write to your dental dealer and tell him all about it. In the organization to which I belong, such matters are not at all infrequent. The advice given always is disinterested, frank and helpful and rests upon years of experience along lines that must, to a great degree remain forever closed to the professional man. Let us get closer together—the professional man and the business man each has much that the other *needs.*

REVIEW OF MR. HARTER'S PAPER.

BY DR. OTTO U. KING, GENERAL SECRETARY OF THE NATIONAL DENTAL ASSOCIATION, HUNTINGTON, INDIANA.

I HAVE GREATLY ENJOYED the reading of this masterful paper of Mr. Harter's, and I can say with all sincerity that it is one of the most interesting, instructive and thoughtful papers that I have heard on this subject for a long time. Mr. Harter has dealt, in this paper, with some of the fundamental principles that have to do with our very existence, from an educational and economic standpoint. I am well aware of the fact that no man can write such a paper as this without having studied and given to his subject a great deal of careful thought and research work. I take off my hat and do honor to any man who can write such a paper as this, because it is a paper that should be read and reread to fairly digest its many valuable suggestions, and in fact it may be necessary for some of us to almost commit it to memory, in order that we may practice the great basic truths promulgated. Too many times such a paper as this is prepared after weeks and months, possibly years have been spent on its preparation, and I repeat too many times such a paper is read and we enjoy it for the moment, but go away from a meeting such as this and fail to absorb and study thoroughly the underlying fundamental principles laid down by the author.

While I may differ in a few instances with the essayist, yet on the whole, I have only words of commendation and approval. Therefore, I will, in this review, magnify some of the suggestions of the author in order to call to your mind more specifically the importance of these things and the bearing that they may have upon our success, not only as dentists, but have a vital bearing upon our success in life.

It was my privilege to meet Dr. L. L. Barber of Toledo a few days ago at the Panama-Pacific Dental Congress, in fact I had the pleasure of seeing Chinatown in San Francisco with Dr. Barber and four other friends; and I feel quite sure that I know him intimately, for we did not return to our hotel until 2:30 in the morning. I can vouch for this, that Dr. Barber is a good guide through Chinatown, and therefore, I am quite sure that he would be a good guide for our profession in aiming to raise its standard of efficiency. In the quotation in the paper, Dr. Barber calls attention to the necessity for preliminary education.

PRELIMINARY EDUCATION.

This reminds me of that great picture that so wonderfully impresses me and always has had a marked influence on my life. It is the picture of Napoleon, studying the map of the country over which his army was to pass. And in studying this, you are reminded of the fact that it was a pretty sure indication of the highest military genius, when a commander in chief of the army spends a greater part of the night planning the details of the coming day.

It was my privilege a few days ago to be taken through a large engraving plant, one of the largest institutions of its kind in the country; and while I was being conducted through by the head of this concern, he took special pains to show me the great care and skill necessary to reproduce in colored half-tones the colored photographs, etc. The business man went on to explain what a difficult time he had to secure skilled workmen, then turning to me he said: "Did you notice that young man to whom I introduced you? I shall never forget the day when that fellow walked into my office and introduced himself. I had been having trouble in securing an efficient and capable man, and after considerable correspondence I was able to secure this man at an unheard-of salary for this kind of work in my city. He was the luckiest find in all the years of my experience as a manufacturer. He is the master of every detail of his work." I said to him, "Well, that is an interesting story, but what is there about this man that distinguishes him from the large number of other skilled mechanics that I see here in your employment?" "The secret of this man's success," he replied, "is due to the fact that *he was prepared*. He had an organized chart of every department of the plant; knew all the department heads and the principal men in the departments. He had this all worked out before he ever came into my establishment. He had memorized the name of each department head; knew something about his history and his standing in his work, the length of time he had been employed in the department, the efficiency of each, and the like. He was at home in this plant before he ever started to work for me, because of the fact that he had a thorough working chart of my entire plant to the very minutest detail, and this is one of the essential things for any business organization."

Listen to me, members of my profession! Have you any great aim or purpose in life?

DENTIST'S AIM.

"What are you working for, what is your game?
What are you getting, what is your aim?
Some work for money; some work for fame;
Some work successfully; some work in vain;
Why are you striving? When are you through?
Are you enjoying the work that you do?
If you want money, contentment or fame,
Keep busy doing with your heart in the game.
And while you are doing the best that you can,
Aim toward becoming the right kind of man."

The aim of every dentist should be the making of a more efficient individual. Yes, and more than this. In the very privileges that you enjoy as a professional man you have assumed a great responsibility of educating yourself to be a more proficient dentist.

A PROGRAM OR CHART.

I once read a book entitled "The Young Man With a Program." I have forgotten about all that was in the book but the title made an indelible impression upon my mind. For a successful man or institution must have a well defined program of what he or it expects to accomplish in a given time or either will fail to reach the goal. It is said of Hugh Chalmers that the secret of his success is his ability to energize and re-energize himself and to concentrate his mind upon these things which are the most important. Upon his desk is a pad upon which is listed the ten most important things that must be done that day. Not only does he know what he is going to do, but he demands that all his co-workers know what they are going to do. He is liable to drop into any office and ask the department head "What is the most important thing you have done today?" With an executive like that continually on the job, with the eyes that see everything, with the knowledge of the entire business at his command, one can understand that the workers are as close to being 100 per cent. efficient as it is possible for human beings to be. Chalmers is not looking for perfect men, he wants men of action who are right at least three times out of five.

Now I have no doubt but what some of you fellows have already said, What has this Chalmers business got to do with a dentist? I'll tell you. I am trying to give you an idea of what it takes in a man to make of him a great executive. If it takes all of his study and time and the necessity for such a man to be continually on the job, as we say, it only proves to me and to you, the necessity for us in our professional lives, to imitate these successful men in as far as it has to do with our particular success in life. I often wondered how some of our dentists exist. They seemingly give to their profession no particular thought, have no plan of study, nothing definite, no aim in life, but simply go drifting along life's way in an easy-go-lucky sort of spirit. This principle to which I have referred, and which the essayist has magnified in his paper, is one of the most vital in the life of any man. Upon this principle his success in life is determined.

BE A STUDENT.

I wish that every one of you might remember that it is not the dramatic moments of life that count. It is the quiet planning and reading of the man who is getting ready now for what is going to happen two, five or ten years from now. Oh, I wish I could impress upon every man in our profession this fact, that mental stagnation is sure to halt a man's progress. Mere momentum will not carry him far. When he is satisfied with himself and stops growing, he has also stopped moving. The ablest dentist is a constant student. The dental profession must be so organized that it will create and develop the best in every member, an eagerness and desire to keep on learning more of his great profession and its great aims.

GREAT DENTISTS ARE STUDENTS.

I trust you will pardon this personal reference, but it illustrates my meaning. At San Francisco a few days ago, when I received a telegram announcing the death of Dr. G. V. Black, while I already knew of his illness, yet I was greatly shocked. I thought of what a terrible loss the dental profession would sustain in the death of such a great scientific dentist. I was reminded of what his life had meant to me; I shall never forget the little conversation I had with him. I asked him how in the world he was able to do the tremendous amount of research work—look after the great college, and all the other versified interests that he was looking after during his active life. He explained that he had made it the habit of his life, from the very first day he opened his office, to go to his office one hour earlier than office hours, close his door, bolt it and let no one enter, because he had decided to do a definite line of study and research work. He continued by saying that it was only a very short time until the one hour was not sufficient for this study. Then he added on two hours and three hours, until it became the consuming aim and desire of his life, to ascertain great fundamental truths and scientific facts of dental science. Is it any wonder that G. V. Black for years has stood head and shoulders above any other dentist in our profession? That same evening, I had the opportunity of congratulating Dr. Truman W. Brophy on the completion of his new book on "*Oral Surgery.*" Dr. Brophy placed his hand on my shoulder and said, "Dr. King, do you know what it has cost me to produce that book?" I said, "I do not know, but I imagine it has meant years and years of study and thought." He said, "Yes, and for the last three years, I have scarcely had an evening with my family; I have ostracized myself from home and society in order to write this book on Oral Surgery." Now, again, is it any wonder that Dr. Truman W. Brophy stands at the head of the oral surgeons of the world? To Dr. Brophy belongs the credit and the honor for having first given to the world the best surgical methods for cleft-palate and hare-lip operations. My brothers, look what it has cost these men to reach their position in our profession. Now, I want you to seriously consider this one proposition: If it has cost these men such labor and hard work, do you expect to do or ever arrive any place worth while in life, without careful thought and preparation upon some definite aim in life? *The biggest job facing any dentist is himself.*

COURAGE.

Did you ever notice that there is an inherent something in every successful man that singles him out and sets him apart? He has ideas of his own, and in those ideas he has faith so supreme that nothing can shake it. To be yourself calls for a courage that must defy the accepted order of things, and the lack of that courage, the fear that the world would ridicule, denounce or suppress, is the barrier that discourages and finally smothers genius. I wish every dentist in the land might come to understand that "Nobody has a mortgage on success." There hasn't been a thing done since the world began that cannot be duplicated.

MONEY AND SUCCESS.

I realize that money is mighty and a reasonable amount of it seems necessary, but to lose yourself in the insane scramble for money is to lose every hope of finding a place in history among the immortals who have done great and good deeds, and gone to their rest with their names graven deep in the grateful memory of the human race. Some one has said: "Of the hundreds of millions of men who have passed through this thing we call life, a scanty few have left an impress that the resistless movement of the ages has not swept away. And among the names of these mental giants whose fame has long outlived their clay, I fail to find one whose renown is built upon ability to obtain great riches." Quite recently a prominent man gave the names of twenty men who, in his opinion, have most benefited the human race. The list has been revised and rewritten many times, and among all the names in all the lists, not one appears of a "rich man" as we understand the term today.

HOLD ON TO YOUR VISION.

In conversation with a very learned man a few days ago, we were discussing the failure in life of a very prominent man, and he replied that the man had "lost his vision," Now, I would not have any of you lose your vision or aim. However, always bear in mind the necessity for looking out for your own financial welfare. Do not be a theorist, but be a practical man and look after the business side of your work.

It is said of John H. Petterson, President of the National Cash Register Company, that he was not satisfied with the sales production of the company's sales force. He investigated, and after visiting all the selling centers of the company's organization, talking to nearly all the men, he found: *First:* They did not know what they were selling. *Second:* They didn't know the most efficient ways to sell cash registers to different lines of business. Now, it is your business as a proprietor of yourself and office, to investigate your own organization and after you have thoroughly investigated, then sit down with yourself and formulate definite plans, that will remedy a useless waste of energy and raise your efficiency.

YOUR INDIVIDUALITY.

Did you ever notice that the individuality of a store is the real attractive force? It may be a store of price, in which case the service is tested by the kind and quality of goods sold at a price. It may be modishness, up to dateness, advertising salesmanship, merchandise, low price, high qualities, and even all of these things together do not constitute the individuality.

There is something about a Pennsylvania railroad man which makes him different from all other railroad men. There is something about a National cash register man which makes him different from other specialty salesman. There is something about a John Wanamaker salesman, which makes him different from a Siegel-Cooper salesman, and yet each one of these has an individuality which makes him John Jones, or Tom Simth, etc.

DON'T BE AN EGOTIST.

A good business man is the lengthened shade of a good man. Egotists like John R. Walsh are a menace, no matter how much they give in alms to the church or to the poor; they are a danger to the commercial world, no matter how many great schemes their fertile brains may elaborate. As some man has said: "The difference between the egotist and the conceited man is that the egotist acts as though the world has been made for him, and the conceited man as though he had made the world."

We are agreed that great souls furnish the energizing power of mankind, that the world moves because some men move.

Therefore, you cannot ignore the past of your work. "Study the masters," find what is great in them, think their thoughts, feel through them, work after their style. A man cannot be original, except to be originally bad, who does not have a deep intimacy with the great things that have been accomplished. As a master builder once said, "If you begin by the end, you are in danger of ending by the beginning."

"Big men know the law and obey it—they think, and know and then act—they get the facts, not opinions. Why? Because nothing else pays. They know the consequences."

"This great fight for efficiency is a fight of individual imperfections, the conquest of mind and soul over body. It is a revolution in our ways of thinking."

DENTIST WITH A GROUCH.

"The man who goes through the world with a grouch, who is always watching for an opportunity to get square with somebody whom he thinks has done him an injury, is at a great disadvantage," says Orson Sweet Marsden. The desire for revenge acts in the system like a leaven of poison, crippling the brain power and producing unhappiness. No one can do his best when he has an unkind feeling or resentment in his heart for his fellowmen. We are always prejudiced against those who have the reputation of being grouchy, or who are of a suspicious disposition.

These lines have been helpful to me:

"Say, what's the use of taking stock
In all those things we hear—
Why 'rip the lining' out of 'Jones'
And make 'Smith' look so queer?
You cannot always tell, my boy,
Perhaps 'tis all a lie——
Just step around behind some tree
And watch yourself go by.

"You'll find that things look different
And crooked paths look straight—
That 'Smith' is not the only man
Who sometimes 'gets home late';
Perhaps your wife's own husband
Sometimes gets all awry—
So step around behind some tree
And watch yourself go by.

"In business as in pleasure,
And in the social life,
It doesn't pay to speculate
Or let your thoughts run rife,
But try to think the best of those
Who in your pathway lie—
Then slip around behind some tree
And watch yourself go by."

OUR INVESTMENTS.

Fellows, I tell you that it is no secret that we are mighty poor financiers. In other words we are not careful and thoughtful enough, in making our surplus money bring in the revenue that it should. Neither are we conservative enough in our investments. A short time ago I was called upon by one of these well-dressed, fine-looking young gentleman, selling a certain class of stock that he was confident would bring in a return of ten to fifteen per cent. on the money invested. After he had presented his proposition, I very frankly informed him that I was no longer in the sucker class for such investments. In fact, I had profited by the experiences of others and never had considered for a moment the investment of my funds in such a proposition. However, I said to him, "Now since I have been eliminated from your class of investors and you see that it is impossible for you to do any business with me, I want to ask of you this question and would like for you to give me a frank statement." I said, "Now, when you visit a city like Huntington, upon whom do you first call? In other words, who are your first suckers." He replied by saying, "The first men that we call on are the preachers. The second are the dentists and physicians; and to be perfectly frank with you, these are about the only classes that we expect to do business with, with this line of investment." Now Mr. Harter has already called your attention to these stocks that you should not invest or speculate in. Therefore, I would like to discuss a few of the investments that are safe and will return a conservative interest on the money invested.

INTERVIEWING THE BANKERS.

In order that I might be able to present to you something definite along this line of investment, from men who have and are spending their lives in this work, I took time yesterday morning and visited every banker in the city of Huntington, and here are some of the interviews.

Mr. A, a man who has been at least forty years in the banking business, and the President of a bank, said that any banker would be pleased and perfectly willing to take the time to have any of his depositors call at his bank and he would go into detail in this matter, showing them the different lines of bonds that might be procured, and he would be able to give them advice in this matter, that he felt sure that such an interview would be worth more to a dentist than the advice received of a stranger. He advised a dentist to invest his money in bonds, and if he lived in Indiana, to buy county, state or municipal bonds. In purchasing any of these non-taxable bonds, they would bring in from 4% to 4½% interest, net, and that this was always a conservative and safe investment. However, he did not advise the purchasing of government bonds, owing to the fact that they were subject to legislation. Of course I would not go into this feature of this proposition, for it would bring us into politics.

Now, banker B recommended that a dentist purchase real estate or something tangible, and if he was careful in these investments, he would realize a larger per cent. of revenue than he could in bonds. However, he recommended also the investment in gravel roads, municipal and state bonds.

Banker C. This man corroborated the statement of the two previous men interviewed.

Banker D. This President of one of the largest and most conservative banks recommended that if any one cared to speculate a little in their investments, he would advise them to notice the Chicago Stock Exchange and purchase stock that was listed, such as Armour & Company, Swift & Company, Bethlehem Steel, Indiana Steel or United States Steel. He also showed me the New York Exchange report, issued by the "Commercial and Financial Chronicle" of New York City, and said if dentists would keep in close touch with this Stock Exchange matter and with their banker, that a banker is always up on these matters, and he showed me for instance that Swift & Company stock was sold at 74, but it paid seven per cent. interest on the stock, and today it is selling for 119, which makes a forty-five per cent. investment besides a ten per cent. dividend. In this report we also noticed that the Canadian Pacific at the beginning of the war, sold at 98, while today it is selling for 162, and it has been up to 220½, in February. Now, these investments have back of them tangible property and assets and if one cares to speculate conservatively, here is the place to do it. You have something tangible back of the proposition.

Banker D said, "Confidentially if I were in the investment business, I would today buy United States Steel, owing to the fact that the Bethlehem Steel secured the war orders, and their stock now is at a high mark, while the United States Steel is at a low mark, and will be in the market for all local orders. When this Company receives a large local order, this stock must go up."

Now, it seems to me that we have given you enough practical information that should call our attention to the necessity of consulting our banker in these investments. Let's be a little more conservative in our investments and consult our bankers, who are financial experts. I thank you.

DISCUSSION

Dr. Clem Shideler, South Bend, Ind: The Northern Indiana Dental Society surely is to be congratulated for this paper. Mr. Harter sent a copy of this to me about two weeks ago, containing practically everything except the chart and the discussion relating to the record book. There is so much in this paper that is really good for us that I will not attempt to say very much about the good things in it. There are some things I do not exactly agree with, and those are the things we usually want to bring up in a discussion. Now, among other things he says is one thing which I have been pondering over—I won't tell you for how many years—but it was before I entered dentistry. He gives us a quotation from one of the greatest scientists along the lines of psychology says, that "every child has within him potential powers capable of being developed that will make him the equal of any other. What then is the difference between the artist and the plodder? So far as I am able to see the sole difference lies in application, training, making the most or least of what one is." That was presented to me at some time, and I have gone over that all these years, but I am not entirely able to swallow that, although it is given by a very eminent scientist as being true. I cannot think that I would ever have made a Caruso with proper application, or a Patti or a Paderewski or any of those people, I chose.

I cannot help but believe there is something in the hereditary training for those things. Now, we do have to have the application, and I believe that that is largely true; but I cannot believe, and I have tried to believe it, too, that that is entirely true.

Mr. Harter says that our preliminary education is only a commencement. Now, I wish we could all really realize what that means. When I sat down on a platform and received a diploma a good many years ago, they said that was my commencement. I did not at that time realize what that meant. I have since grown to realize that that was only the commencement of my education. However, I have not so much fault to find with the present system of education as some seem to find. I believe that the school is the time to store the facts in your mind, and later you can develope those and bring them out. You have a diversified education, and you learn where to get the things that you want later in life.

Going directly now to some of the practical things in Mr. Harter's paper, there is one thing I want to especially commend him on, and it is a thing that I have suggested for the last three or four years, but haven't entirely, although quite largely, put in practice, and that is, making your salary depend upon your last year's business; your salary for 1915 depend upon your business for 1914. If you did, say, a net business of $3,000 in 1914, you ought not to spend $3,000 on your living expenses in 1915. That amount, for instance, is sufficient for every one to save a certain amount, and whatever you decide upon, save, no difference whether you make in 1915 four or five thousand dollars, don't spend it, because you have no right to.

I thought in the beginning that Mr. Harter was perhaps biased, that is, not neutral, but I know now that he is not. Because he was quoted from the two great powers at war. In the paper as it was sent me, he quotes Lord Kitchener several times, and as that is all I had in my paper, I thought from that he belonged to the Allies. But he used another expression, and I know now that he is neutral, although he did not quote this, it is not original with him, however he may try to make you believe it, because I saw the same quotation. He says if he does not have money enough at the end of the month for the last two or three days for his meals, he goes hungry. That isn't his. Some time ago I saw the statement in regard to the Germans in this present war, and the condition existing there some few years ago, and the attempts of the nobility to curb the high cost of living and set an example before the prosperous younger people coming up, where Von Hindenburg had been in the habit of allowing a certain amount to his family to live on. Now, with a man in his position you would naturally expect that they would have a good deal of money to run that household. But he held them down so tight to the amount of money which he gave them that if they did not have enough money at the end of the month to pay the bills, his wife and family went hungry. He actually says that is true. And the amount he gave them was eighty dollars per month.

Among Mr. Harter's "Dont's"—Jefferson's rules I believe he called them—he has one in there, "Don't buy mining stock." Now, I just want to give you a little personal experience. I was considerably in debt when I left college. In the course of two or three years I had those debts all paid, I had a little bank account, and some of my very best and intimate friends, young fellows like myself, told me of a man that was in town who came back and paid up some debts he had incurred years before, showing that he was pretty prosperous. This man had some stock for sale and he didn't go to the people who usually buy stock, because these boys weren't boys who usually bought stock, at least the wild-cat kind of stock, and then as a personal privilege—they had never said anything to me of any other investment—but as a personal privilege they told me that they thought it was a good thing and they would like to see me take advantage of it. I made an appointment with him one evening, and came down to talk the matter over, all of us, and for two hours at least we talked it over, and we got this man's story, and I decided that it was a pretty good thing, and we believed that we would take some stock. I decided to take, I believe, 100 shares at $3.50 a share. Now, mind you, this was the first money I had earned after getting my college expenses paid—the first real money that was mine. I did not have quite $350 in the bank. I do not remember now what it lacked, but it was a little less. So I signed up a contract with this man, expecting in a few days to be able to collect enough to write him a check for $350. In the meantime I got to thinking that over, and I called up a man, whom I knew to be a very conservative man, too, and he was a life-long friend of my family, and I asked him if I could have a little private conversation with him. He readily granted it, and the hour was set, and I went to my friend's, and in the course of that conversation he said this, and that saved me from losing some money in mining stock: "A man has no right to speculate, and by speculating I mean, all the amount of money that he puts into the stock himself, and all that he is liable for in assessments on those stocks, when that money will in any way affect his business, his personal interests, his personal pleasure or his family."

Now, this was the way I figured it out after I went home. It would not in any way affect my business, because I was more than paying expenses. It would not affect my family because I had none. But I could have a blamed good time on that $350, and when the man came around for me to give him a check for that amount, I balked, and I didn't give it to him. And that has been my experience in buying mining stock. Those three things are the things that saved me, always thinking how much fun I could have on that $350. (Laughter.) I will say, by way of following this up, that this man took $42,000, that I know of, out of the city in the course of two or three weeks, and do you know how much came back? Not one red cent. The mine is down there yet and you can buy it for a song; at least I guess it is there.

Just a word or so more, and I am through. Next to the dentist in my own locality I would rather have a dental dealer my friend than anybody else. First, I want the dentists in my locality to be my friends. I prefer them above anybody else as a class. Then I feel that the dental dealer is the next man to have as my friend. And what Mr. Harter says is largely true with regard to what they will do for us. But on the other hand they are not always our good Samaritans, so to speak, if I may use that word, and I will give you one concrete example. A good many of them are pretty prone to overload us. Now, that is poor business, Mr. Harter.

Mr. Harter: Positively. The poorest kind of business.

Mr. Shideler: The business man or manufacturer or wholesaler should not overload his patrons. He should not sell them goods that they cannot sell. I know of an instance not long ago where a young man just started in dentistry, and he had no special prospects before him, his office was meagerly fitted up, and one of the oldest dealers in the country sold him three hundred dollars worth of teeth and crowns. Now, how was he going to use that amount?

Mr. Harter: Positively foolish.

Dr. Shideler: That is true. And that is one of the old houses, one on whom we can usually bank.

I do not know as I have anything more to add to this. Again, I want to thank Mr. Harter very much for his paper because it has been a good thing for all of us. (Applause).

Mr. Harter: (Closing). I don't know how you people are ever going to pay me for coming down here. To get Dr. King to talk such a length of time is certainly worth while. I will say just a word with reference to Dr. Shideler's remarks. There isn't anything to answer, but there are two or three little things to explain. Dr. Shideler says he would like to believe that every child had in him equal power, equal potential power with any other. That idea is shown by the present drift of our vocational education. It was Muensterburg that I quoted, and a great many men are associated and working with him along the line of vocational education. If the child is understood, if the child's capacity and innate tendencies are considered, it will be found that he has within him the power to become an artist in some line, and by an artist is not meant a painter or a sculptor or a musician, but an artist in his own way, an artist in living. The equivalent, the equal, of any other, but not the same. There are some men that never could become dentists; but the viewpoint that each takes of his life could be developed, could be brought out. In other words, that there need be no dolts, and there need be no shining stars; that each individual child, if properly considered, if taken for what it is and given the proper education, that is, have breathed into it this individuality, would be just as great as any other child. That is the point as I understand it.

Now I am glad that Dr. King is here, and I am very glad that he said what he did. There is one thing I want to say about colleges. He says this is not the place to discuss these things. That is true. These papers should be read before the colleges. But I will tell you how difficult that is. I have been trying personally for the last two or three years to get this into the colleges. I wrote to the dean of one of the most prominent colleges, but a man who knows no more about business than a Hottentot knows about heaven—personally one of the finest of men, but has no conception of business whatever, and he replied, "Why, my dear Harter, I personally lecture my students and have for the last twenty years." There you are! He knows no more about modern business than I know about the snows in Alaska. But we are going to get there some of these days.

Now, these different training methods are practiced by the greatest men that we have, not that they may hear watches, or do this or that particular thing, but that they may be able to re-energize themselves and that is the way they do it. How does Chalmers do it? Why, by some definite practice of this kind. He does not tell everybody about it; does not tell anybody, perhaps, but some people have told us that they do it, and it is because of that that I am able to come here today and tell you these things. It is not that you may become great breathers, or keen hearers, or great prize fighters, but that you may become greater dentists—every faculty on edge. What kept Dr. Black alive so long? *Interest.* What took him to his office an hour earlier every morning and finally three hours, and sometimes all night? *Interest.* Interest in life, in his work. That is what I want you to have. If you develop yourselves along these lines that other people have tried and found to be good, you will find them to be good.

I omitted a quotation from Nietzsche, and here it is: "Unless you have a definite aim in life on which you concentrate every energy which you have, and every energy you can develop, you might just as well sing the doxology, pronounce the benediction and dismiss your congregation," because you will never get anywhere; and that is dead true. It is in order that you may develop that continued energy that I want to arouse *interest* in you, and the only way I know how to arouse interest is by some method of this kind to enable you to realize the possibilities within you, and be able to go ahead. I think I have now reached my "terminal."

> We can make and keep this country worthy of the men who gave their lives to save it, only on condition that the average man among us, on the whole, does his duty bravely, loyally, and with common sense in whatever position life allots to him.—*Theodore Roosevelt.*

WHY DENTISTS ARE NOT PATHOLOGISTS

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

AT A MEETING OF DENTISTS held in a city not far from Chicago, a few weeks ago where the subject of so-called "Pyorrhea" was discussed, two members of the society took the ground and argued that "dentists were pathologists and that they understood pathology."

The object of this paper is intended to show "why dentists are not pathologists, and why they cannot be by the present methods of teaching." Schools are established and equipped to do special lines of work for educational purposes. Thus, we have schools for the teaching of "theology," "law," "engineering," "medicine," "dentistry," etc. Each school has its particular educated teachers for training the raw material (the freshman student) to obtain certain results (the finished product). The results obtained must be such that the graduate when he leaves the school, is able to begin the practice of his profession successfully. If he is not so equipped, the school soon falls into ill repute and must close its doors. That successful results must be obtained, the teachers in the different schools, must not only be experts in their particular lines but they must know all the facts, as well as theories up to date of their particular subjects.

No matter how desirable it would be for the student of engineering to understand theology, law, medicine, or dentistry; or the dental student to understand medicine, law, theology or engineering, he could not obtain the knowledge except by introducing the subjects into that particular school, or the student after graduation attending the school where the particular subject which he is desirous of obtaining is taught. In either case, the extra time required to educate the specialist must be added to the time required the student to graduate, in his particular profession.

A college having a fixed aim in view for its graduates, by having extra chairs added to the curriculum, the student is apt to pay little attention to the subjects that do not bear directly upon the requirements for graduation. In other words the student as a rule will try to get through college as easily, quickly and cheaply as possible, by fulfilling the most urgent requirements for graduation.

It is as impossible to make shoes in an automobile factory, as it is to make automobiles in a shoe factory. The machinery is not adapted for the special work. The same is true in relation to dental schools and medical schools. We can no more make pathologists in the present dental schools, than we can make mechanics in medical schools. The aim and object of the faculty of a dental school is to turn out first class mechanics. The school is equipped for that purpose. The aim and object of the faculty of a medical school is to graduate first class pathologists, since these schools are prepared to do so.

If the aim of the school is to accomplish a certain object, it is difficult to introduce subjects foreign to that object, which will benefit the school or the student. The reason, therefore, why dentists are not pathologists, is that the dental schools aim to turn out mechanics, and not pathologists. Reasoning further along this line since the aim and object of the dental school is to educate its students in mechanics, the dental graduate starts out in life as a mechanic rather than a professional man. He prides himself as a professional man because he has received the degree of "Doctor of Dental Surgery." He can become only partially professional because his calling as practiced is along mechanical lines.

Let us apply this statement to the every day practice of the dentist, and see how his knowledge of mechanics harmonizes with his knowledge of pathology. The treating and filling of the roots of teeth up to the present time has been conducted on mechanical principles. The pathological conditions resulting therefrom are now being exposed by the medical profession.

Perhaps the most glaring ignorance of a knowledge of pathology is that displayed by the teachers in our schools, by calling a disease which produces absorption of the alveolar process and loss of the teeth "Pyorrhea Alveolaris," when pyorrhea has nothing to do with the etiology or pathology of the disease. This in the face of the fact that the attention of the teachers has frequently been called to this fallacy for more than 20 years.

One of the most absurd methods of dental practice is the supposed curing of interstitial gingivitis by instrumentation. There are many men, some of them teachers, who with 150 or more instruments will gouge and injure the tissues about the roots of the teeth regardless of whether calcic deposits are present or not. The suffering of the patient under such treatment is inexcusable.

There are schools in this country in which, for $175.00, the teachers agree to educate dentists in four weeks, how to "cure pyorrhea to their entire satisfaction," by the use of a large number of instruments for which an extra price is charged. It is immaterial whether the disease is due to calcic deposits, tuberculosis, indicanuria, heart lesions, syphilis, kidney troubles, auto-intoxications, acidosis and other constitutional conditions producing stasis of blood, a lowered vitality, and want of resistance. It is surprising how many graduates of dentistry are taking the course.

Since dentists are educated as master mechanics, how could diseases of the body, no matter where located or of what nature, be treated other than by mechanical means?

Another glaring example of the want of knowledge of pathology by the dentists, is shown in hundreds, and I might say thousands of papers written upon the subject of "So-called Pyorrhea," in the last 30 years. Hardly one of these papers is based upon the pathology of the disease. The pathology is not mentioned either by the essayists or in the discussions.

Beautiful jewelry work is manufactured and placed upon the roots of the teeth, in the form of crowns and bridges, regardless of the pathological conditions of the roots and the surrounding structures.

While preparing this paper a physician said to me: "I have just had a bridge adjusted in my mouth and the dentist—who is regarded as one of the best in the city—said to me, 'I want to call your attention to this beautiful piece of work and how well it articulates.' Although it has been in my mouth not quite two weeks," the physician said, "I am already having considerable soreness and an uncomfortable feeling at the apex of the cuspid root, one of the abutments of the bridge."

This is a splendid illustration of the standing of the dental profession today in its relation to mechanics and pathology. The dental profession is producing more pathology in the mouth by their mechanics than any other one cause.

Boring holes in the alveolar process and inserting dead teeth, has been practiced regardless of the pathological conditions resulting, but fortunately it is only occasionally performed, always with doubtful results, owing to the pathological changes taking place in the roots of the teeth and alveolar process.

The correction of jaw deformities and irregularities of the teeth based upon mal-occlusion, regardless of the etiology and pathology, is certainly very crude practice in these enlightened times.

So grounded in the minds of the dental profession today is the mechanics of our specialty that no dental meeting can be held without making clinics its drawing card.

Our charges for dental work and making out bills are along mechanical rather than professional lines.

Having demonstrated some of the glaring defects in our present methods of teaching and practicing, and taking modern surgery as our criterion, it will be seen that we must revolutionize the practice from a mechanical to a pathological basis.

But what of our present method of teaching students, since they care nothing for studies not directly bearing upon the practice of mechanics and are non-essentials for graduation? We must revolutionize our methods of teaching. Instead of the faculty basing the qualifications of the students to graduate upon proficient mechanics, such as artificial dentures, crown and bridge work, a given number of gold, amalgam, cement and other fillings; phylogeny, embryology, ontogeny, histology, and pathology should be the objects aimed at since the mechanics of dentistry are only for the purpose of restoring pathologic conditions.

Some of us saw the pathologic vision 40 years ago and we gave up the practice of dentistry for the time being to study medicine; we have never regretted it.

A knowledge of the diseases of the body at the present time requires us to change our view-point as to the object of the dental profession. The health of the patient and his tissues should ever be the foremost thought in the minds of teacher and dentist. The health of the patient is worth more than all the teeth in the mouth.

The pathologic vision is now in our midst, and no dentist is so blind that he cannot see it. The medical profession is seeking the service of those dentists who possess a medical education. They are already tabooing the average dentist as being unskilled in his profession.

I realize that evolution is not based upon sudden fits and starts in any direction. To arrive at a successful issue, we must start right and progress slowly.

A dentist should be as well educated when he enters upon the study of his specialty, as any other specialists in medicine. Academic training, therefore, should be required. Pathology is based upon the fundamental principles of medicine. The student should matriculate with the medical students and pursue the same course of instruction for the first two medical years.

The student should not be allowed to enter a dental clinic until his third year. At this period he has obtained a broad general knowledge of literature, he has learned how to study and to think, and he has not narrowed his horizon by the mechanics of his profession. He has obtained a fair general knowledge of the fundamental principles of medicine, including pathology.

He should obtain due credit for his medical studies so far as he has progressed. Should he desire to obtain a medical degree, after he has graduated in dentistry, he has so much to his credit. He will not be obliged to take a full four year course over again.

The third and fourth years are all that is necessary to acquire his special training in the mechanics of dentistry.

The pathologic vision, which is so vividly displayed at the present time in every day practice, must impress every dentist with the necessity of a medical education. The dental profession as represented in The National, State, and District societies, should forget their own narrow training, band together and demand that the teachers of every dental school in the country shall so shape their dental curriculum that the student practically receives a thorough medical education when he graduates.

I doubt if there is a dentist practicing today who does not wish that he had received such training himself.

Our profession is about to pass through the greatest scrutiny in our history, due in a majority of instances to faulty methods of dental practice. The medical profession in the past two years has discovered that a larger majority of the obscure diseases, which they have heretofore been unable to diagnose,are actually due to focal infection in the mouth and about the teeth.

Physicians will not feel satisfied with their diagnosis in a single instance until they are sure that the mouths of their patients are free from diseases.

No surgeon will undertake an operation until the mouths of the patients have been placed in an aseptic condition. This means a better knowledge and exploration in broader fields than the average dentist has heretofore undertaken.

Dentistry as practiced today was born in iniquity and sin with a breech presentation—ignorance.

If the profession is to accomplish anything and hold its own with other specialties in medicine, it must be born again in the natural way with a head presentation, full of brains to reconstruct our present faulty methods of practice. Demoralized by mechanics we have lost sight of the "pathologic vision."

Columbus Memorial Bldg.'

EPULIS

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THIS IS A STUDY of the specimens of epulides in the Laboratory of Pathology of the Ohio State University. It is the desire of the authors to emphasize the need for close cooperation between surgeon and pathologist, and that here as elsewhere in dealing with new growths, the important thing, both in treatment and prognosis, is a thorough knowledge of the behavior of the tumor cells in the particular case under consideration.

The literature has recently been collected and the resume' given with such accuracy that the authors do not feel that such a review is called for in this paper.

The word "Epulis" is used by some writers as a topographical term. The word in its original meaning signifies any growth upon the gums. In most cases, however, the term is used for those tumors which are apparently seated upon the gum or the upper edge of the alveolar border and which are of mesothelial origin.

It may be confused with papilloma, carcinoma, inflammatory conditions, and the hypertrophy of the gums which accompanies pregnancy.

In the series upon which this study is based, there were four simple inflammatory nodules removed under the diagnosis of epulis. Epulides occur more frequently in younger patients. They occur in the larger reported series much more frequently in women. This, however, may prove deceiving where a limited number of cases are seen, as it is quite probable that sex plays no part in the production. In the nine epulides sent to the laboratory in this clinic during the last two years seven were in men.

There appear to be at least three distinct varieties. First, the hard variety which is a fibroma pure and simple. It is usually small in size and arises between two teeth. After loosening these, it spreads out over the alveolar border. In color, the mucous membrane covering the tumor may be slightly reddened, but as a rule, it differs but little from that of the normal gum.

It is as a rule slow in growth, changing but little in its size in months or even years. Microscopically, this type is composed of fibroblasts which are rather well differentiated and form an interlacing net work of fibrous tissue. This type springs from the periosteum lining the alveolar process.

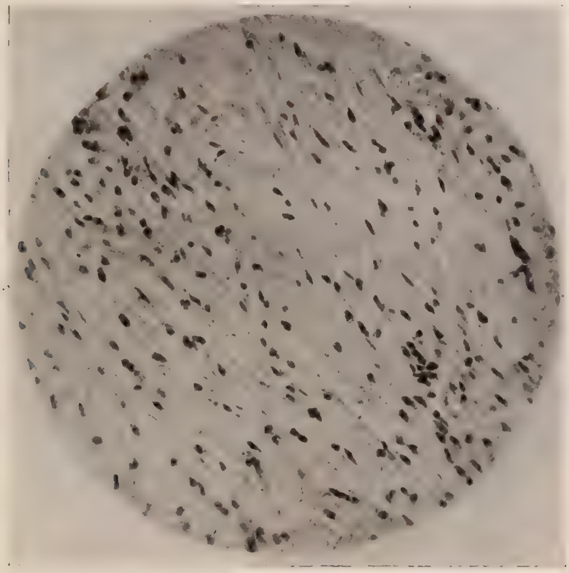

Fig. 1. A fibrous epulis. Note the regular arrangement of the cells.

The second variety is the soft or "giant celled" epulis. This is a reddish, irregular tumor, located at gum border, usually at the inside of the teeth, This type is usually rapid in its growth. Microscopically, it exhibits a tumor cell which is of the connective tissue type, with many blood vessels and giant cells of the foreign body variety. The areas of cartilage and the spiculae of bone often seen in these tumors suggest to Scudder that they take their origin from the fibroblasts of the periosteum. Mallory regards the giant cells as fused endothelial leucocytes attracted into the tumor by the presence of lime salts. He feels that our attention should be directed to the tumor cell since the giant cells do not signify either rapid growth or malignancy.

A great deal of difference of opinion exists as to the malignancy of these tumors. Since these growths represent forms of lawless growth of connective tissue cells, the important thing is to find out just what these cells are doing. The rate of the growth should be ascertained by a histologic study of them, searching for mitotic figures, and determining the degree of differentiation to which the cells are attaining. Then the structure of the tumor must be considered. It should be noted whether these cells are arranging themselves in a position normal to connective tissue, or whether they are typical in both form and arrangement. In a word, these tumors should receive the same study as do connective tissue tumors elsewhere, and the diagnosis and prognosis be made accordingly.

The second factor which has brought about a difference of opinion concerning the relative malignancy of these is their confusion with the third form of mesothelial tumor which sometimes occurs in the gum margin. Whitman has recently described this type of new growth which is distinctly of endothelial origin.

Ivy has added another case presenting a similar clinical and histological picture. These two cases are more malignant than the usual forms.

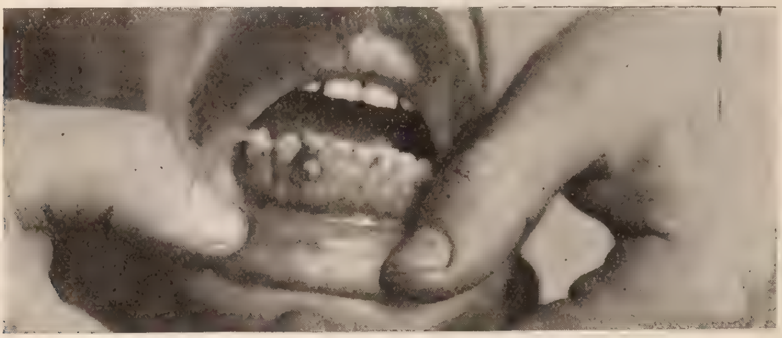

Fig. 2. A giant cell epulis.

Epulides always occurring singly are more commonly found at or near the cuspids or first bicuspids. They are almost never found posterior to the last molar teeth, and only but rarely in the incisor region. They show no especial predilection for either jaw. They very frequently follow caries of a tooth or an extraction.

As outlined by Gruet, the symptoms of epulis can be conveniently divided into three periods.

First: The beginning stage, or, as it might be called, "the period of functional disturbance." In this stage the tumor is not yet visible, and the tooth has not been loosened by the growth. Pain along the distribution of the inferior dental branch of the fifth nerve—neuralgic in character, is the only indication of the disease. This is due to the fact that the tumor arising from the peridental membrane or periosteum makes pressure in its growth upon the nerve as it enters the tooth, and thereby causes the sensory disturbance. During the latter part of this period, as the growth enlarges the tooth becomes loosened or separated from the adjoining teeth, and is slightly elevated above the occlusal line. This brings it in prominent contact with the opposing teeth of the other jaw when the jaws are closed, and causes tenderness.

The second period, or that in which a tumor is present, is usually marked by a disappearance of the functional distress, because of the relief of pressure with the escape of the tumor from the tooth socket.

The fibrous type of epulis appears as a small, smooth, rounded tumor varying in size from a pea to an olive, arising always on the alveolar border near the tooth socket. Often it includes one or more teeth. It is usually attached by a narrow fibrous band. The mucous membrane covering it differs but slightly in color from that of the surrounding mucous membrane.

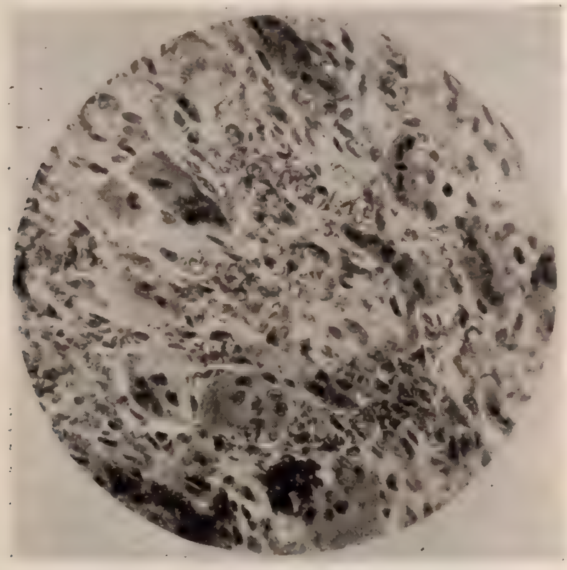

Fig. 3. Showing the giant cells and the tumor cells—the fibroblasts.

The vascular type, or myeloid epulis, varies only in its physical appearance, being a small, red, regular, tumor which rarely attains large size, and which bleeds on the slightest manipulation. This type of tumor is said by some to follow pregnancy quite often.

The third period is not so frequently seen. This stage is characterized by necrosis. Necrosis taking place in epulis is superficial and almost entirely due to pressure on the mucous membrane by the growth underneath. Enlargement of the adjacent lymph nodes may take place in this period.

A diagnosis of epulis, especially in the period of functional manifestations, will sometimes be difficult to make, but with the appearance of the tumor, this is simplified. It must be borne in mind that carcinoma and sarcoma may appear at the same site, and epulis has often been mistaken for one or the other of these tumors, or for a simple inflammatory mass. If, however, careful inquiry into the history, and close physical examination of the tumor are made, the differential diagnosis will not be so difficult. The rate and manner of growth of both carcinoma and sarcoma are so distinguishable of those tumors that epulis should not be mistaken for them.

The prognosis of epulis, in general, is good, providing careful excision has been made. Incomplete surgery or the use of cauterants is to be discredited, as recurrence very commonly follows such procedure. Recurrences here, as in many other tumors, are more malignant than the primary growth. The myeloid type is always to be viewed with great suspicion.

The treatment, as mentioned above, should consist in a complete removal of the tumor and its point of origin. Since this point of origin is often found in the tooth socket, a removal of a portion of the alveolar process will suffice. The safest treatment by far is the extraction of the teeth on either side and the chiseling away of a small triangular piece of bone or the removal of the alveolar border containing the point of origin. This results in a cure.

The unhappy application of the term "sarcoma" has led to needless mutilations.

Recurrences, it is true, are not uncommon where the work has not been of sufficient thoroughness. Kuhner reports that of seventy-nine patients operated in Tubingen Clinic in thirty-five years, seventy-two were permanently cured; five were cured by a secondary operation, and two died of recurrence.

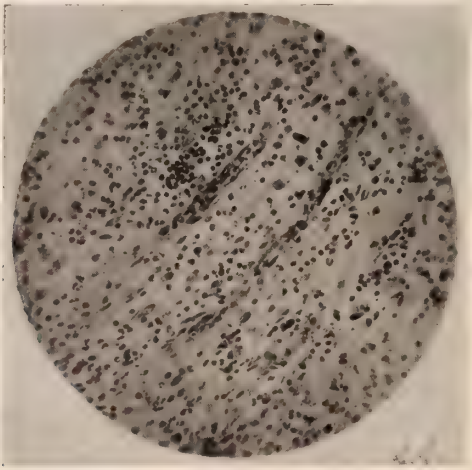

Fig. 4. An area of granulation tissue seen at the margin of necrosis in the same tumor.

The type described by Whitman and Ivy demands more extensive operative treatment.

CONCLUSIONS

1. Here, as with all other tumors of the mouth, a great share of the responsibility rests with the dentist because it is he who sees the patient early.

2. The term "epulis" should be replaced by the correct name of the tumor under consideration.

3. These are as a rule fibroblastomata.

4. Their complete removal will effect a cure.
5. They must be treated as connective tissue tumors are elsewhere, and the prognosis based upon the behavior of the tumor cell.

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SIMPLE METHOD FOR THE LOCAL APPLICATION OF DRUGS IN TREATMENT OF PYORRHEA ALVEOLARIS

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THE OPERATOR in the pursuit of his practice is many times confronted by the problem of how and what is the best method to pursue for making the application of drugs at definite points with least trauma of the tissues at the site of the application. The pus pockets which accompany pyorrhea alveolaris are variable in depth and in size around the roots of the affected teeth. The success of the medicinal treatment of the pockets depends primarily on the method of application of the drugs in them. The author has tried many methods for the application of drugs in the pockets around the roots of teeth affected by pyorrhea, and none of the previously tried methods fulfilled the requirements exacted. First, that the method must be a simple one; Second, that it must be one which causes very little trauma of the tissues; Third, that one must be able to note the passage of the drug into the pocket, for the reason that one wishes to know the quantity which is being placed in it; and Fourth, that the method must by all means be one which is not expensive. In some experimental work on animals the author used glass pipettes for the inoculation of the animals instead of the syringe. The method was so very simple and the operation so easy the author decided that the method had a value other than for animal experimentation, and forthwith tried it as a means for the application of drugs in the pockets around the roots of teeth affected with pyorrhea. From the first trial the method proved most excellent, and since then has been used by the author constantly.

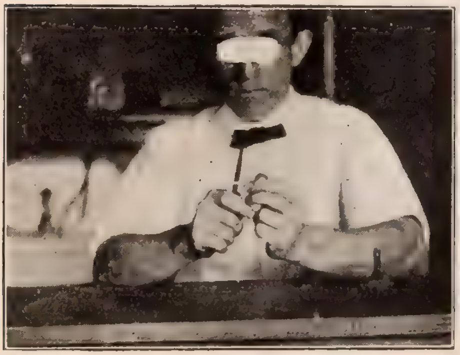
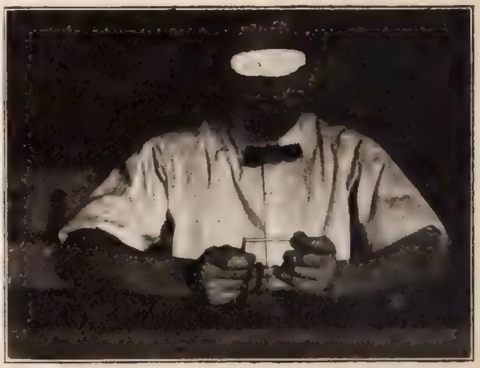



Fig. 1.

Fig. 2.

No. 1—Showing the position of the hands and the file for cutting the glass tubing.
No. 2—Shows the position of the hands and also the glass tubing in the glass flame, immediately before the capillary pipette is drawn.

Before continuing further it will be best to describe the technic and the apparatus used for the capillary glass pipettes. The apparatus needed is the following: thumb forceps and an ordinary bunsen burner, or alcohol lamp. Glass tubing which is used is cut into lengths of 200 mm. having a diameter of 2 mm. with a triangular file. The technic for cutting the glass tubing is as follows: The tubing to be cut into lengths is held between the thumb and fingers of the left hand while the file is firmly grasped by the thumb and fingers of the right hand. The edge of the file is now brought

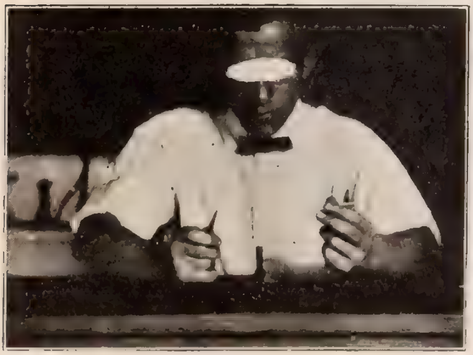
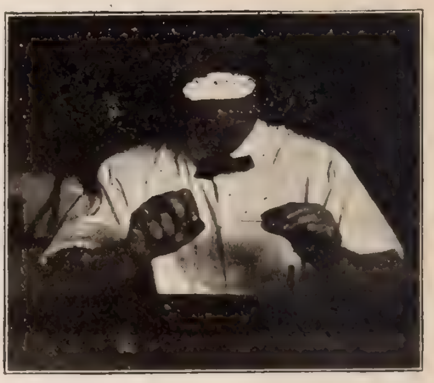



Fig. 3.

Fig. 4.

No. 3—Showing the relative positions of the hands and the drawn capillary pipette.
No. 4—Showing the position of the hands for breaking the capillary pipette.

in contact with the tubing and a deep cut is made with it in the surface of the glass.

The technic for breaking the glass tubing is as follows: After the cut has been made in the surface of the glass tubing it is firmly grasped by the thumb and fingers of the right and left hands, one either side of the file cut. The left hand is held stationary while the right hand is moved outward and downward from the left hand. The point of tensile strength of the glass tubing is soon reached and the glass breaks sharp at the file cut in its surface.

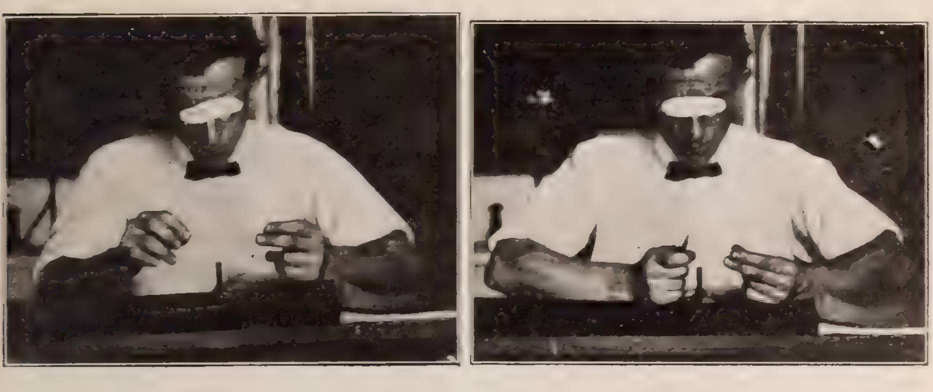


Fig. 5. Fig. 5-a.

No. 5–5a.—Showing the position of the hands or the thumb forceps for bending the capillary pipette.

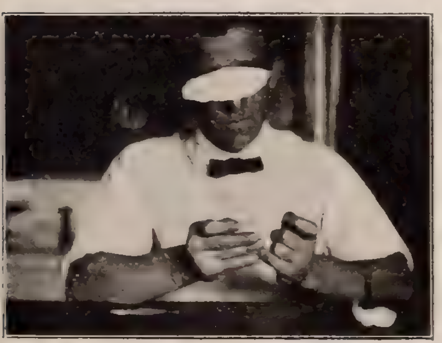


Fig. 6.

Fig. 7.

No. 6—Showing the position of the hands for placing a pledget of cotton in the lumen of the pipette.

No. 7—Showing the rubber tubing attached to the pipette.

The technic for making the capillary pipette is as follows: The piece of glass tubing is held firmly by the thumb and fingers of the left hand in a bunsen flame, and as soon as the glass commences to bend of its own weight it is rolled between the thumb and fingers to insure a more even softness of the heated glass. The instant that the glass maintains a bent position it is firmly grasped with the thumb forceps and at the same time is removed from the bunsen flame and a lateral pull is made with the thumb forceps which are held by the thumb and fingers of the right hand. The pull of the glass is continued until the desired caliber of capillary pipette is drawn. The hands are then held in their relative positions long enough to allow the glass to cool. By observing this step in the technic one has a straight pipette when the pipette is drawn instead of a crooked one.

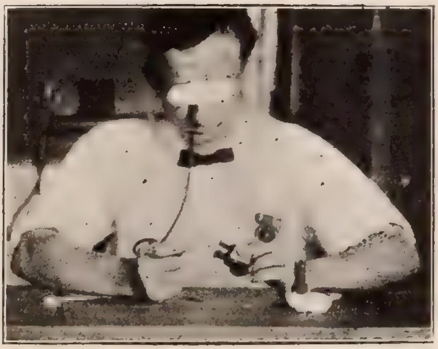


Fig. 8.

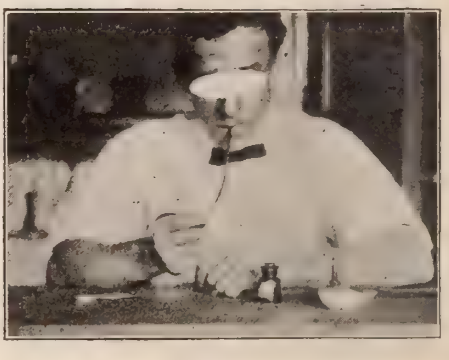


Fig. 9.

No. 8—Showing the position for holding the bottle and the cork of the bottle in the left hand and the pipette in the right hand and the pipette between the lips.

No. 9—Showing the charged pipette.

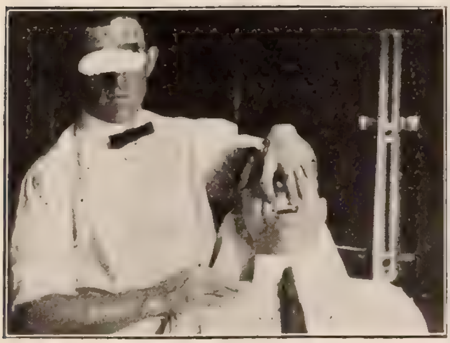


Fig. 10.

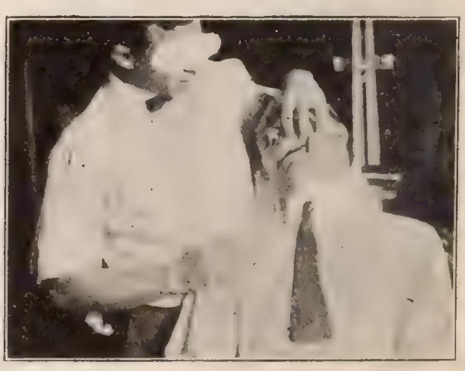


Fig. 11.

No. 10—Showing the cotton roll in position in the anterior superior position.

No. 11—Showing the position of the cotton roll covering the buccal surface of the premolars and molars, and also the mucous membrane of the cheek and alveolus and the gum.

When the drawing of the pipette has been completed, the next step is that of breaking off the pipette to the desired length. The fine capillary portion of the pipette is firmly grasped by the thumb and index fingers of the right and left hands. The force for breaking the pipette is exerted with the right hand, while the left hand is held secure in its position. Thus one again finds that as soon as the point of tensile strength of the glass is reached the fine capillary pipette breaks between the two hands.

The author finds that the straight pipette is not as easy to manipulate as is the pipette which is bent at an angle. Thus when the excess of glass has been broken off one is ready to bend the pipette to the desired angle, and the technic for this step is as follows: The glass tubing is held by the thumb and fingers of the left hand while the fine capillary portion is grasped by the thumb and fingers of the right hand. The base of the capillary portion of the pipette is then held in the gas flame, and while so doing one tries from time to time to bend the capillary pipette on this point with pressure exerted with the right hand. As soon as the glass gives to the pressure of the right hand the capillary portion is bent to the desired angle.

Having bent the pipette to the desired angle the next step is that of plugging the opposite end to the capillary portion with a piece of cotton. The object of this cotton plug is to prevent the beginner from contaminating the pipette with saliva.

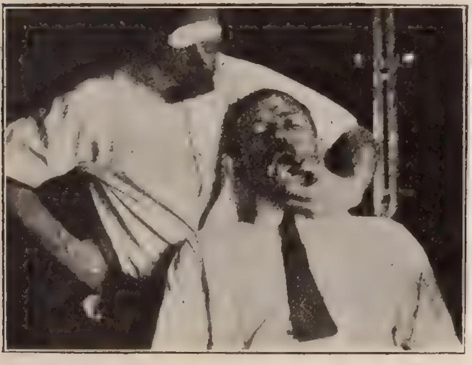


Fig. 12.

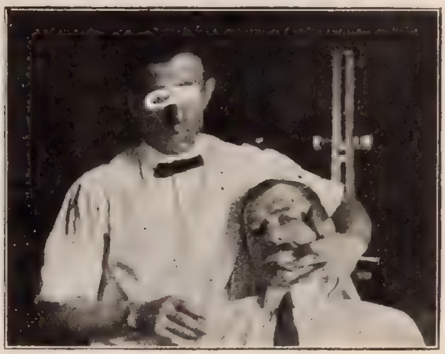


Fig. 13.

No. 12—Showing the cotton roll in position covering the gum, mucous membrane, crown of the anterior teeth and the lips.

No. 13—Showing the position of the cotton roll in the posterior inferior buccal region.

The next step in regular order of technic is that of fastening the rubber tubing to the pipette. The pipette is firmly grasped by the thumb and fingers of the right hand. The rubber tubing is then manipulated so that the pipette slips into its lumen, after which it is evenly distributed with the thumb and fingers of the right hand.

The rubber tubing having been made fast to the pipette the next step is that of charging the pipette. The free end of the rubber tubing attached to the pipette is placed between the lips and the pipette is grasped with the thumb and fingers of the right hand. The point of the pipette is then immersed in the desired liquor and is charged by making gentle suction on the end of the rubber hose held between the lips.

After the pipette has been charged the bottle is returned to its position and the cork placed in its mouth. One is then ready for making the application of the contents of the pipette.

The pipette having been made and charged, the next step is that of protecting the mucous membrane, the lips, the gum, the tongue, the floor of the mouth and the roof of the mouth in the proximity of the area which is to be treated in such a manner that the drug in solution will not come in contact with them. This precaution is carried out with cotton rolls. A very convenient way to make cotton rolls is as follows: In the right hand one holds a round handled instrument and in the left hand a variable size piece of cotton. Some of the fibers of the cotton are secured by twisting the handle of the instrument as soon as they become engaged. One then commences a more rapid rolling of the handle and at the same time feeds the cotton on the instrument. This rolling of the instrument is continued until one has a roll of the desired size. This technic is performed several times before beginning the treatment, and by so doing one has several rolls of various sizes at hand. The cotton rolls having been made the next step is that of placing them in their correct positions.

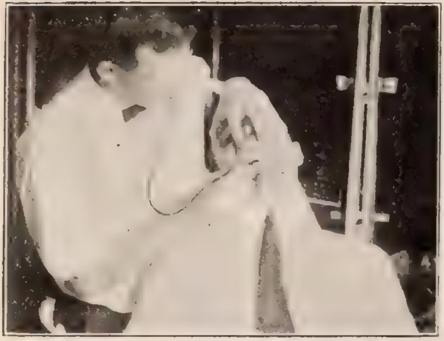


Fig. 14.

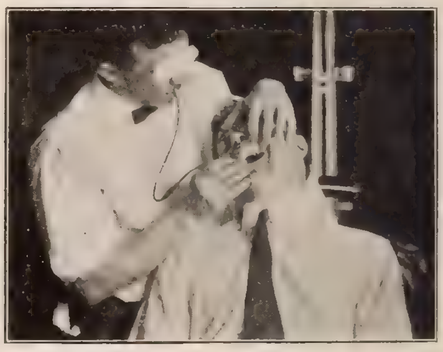


Fig. 15.

No. 14—Showing the position of the hands and the pipette.
No. 15 —Showing the position of the hands and the pipette for application of the posterior superior teeth.

Thus, to place the cotton roll over the gum and the crowns of the anterior teeth, the cotton roll is grasped by the thumb and index finger of the right hand while traction is made with the index and second fingers of the left hand, raising the lip towards the nose and thus exposing the parts to a better advantage. The cotton roll is now placed far up on the surface of the mucous membrane with the thumb and fingers of the right hand. This step is followed by releasing the traction made with the fingers of the left hand and the lip is allowed to fall over the cotton roll. On examination of the position of the cotton roll we now note that the gum at the gingiva of the anterior teeth is well protected, as is also the mucous membrane higher up, and that the lip likewise is well protected.

The labial surfaces having been protected we now protect the lingual surface as follows: The cotton roll is grasped by the thumb and the index finger of the right hand and is carefully placed over the mucous membrane of the roof of the mouth and the gum opposite the teeth which have been protected on the labial surface. The patient is now instructed to close the mouth and by so doing the tongue presses on the cotton roll on the lingual surface and presses it more securely in contact with the tissues which it covers.

Having described the technic for the protection of the anterior superior teeth and the approximating tissues, let us now describe the technic for the protection of the teeth which are distal to the canine. The cotton roll is grasped by the thumb and index fingers of the right hand, while at the same time traction is made at the angle of the mouth with the index finger of the left hand. Thus by the traction we expose to view the teeth. The end of the cotton roll held by the index and second fingers is passed back to the third molar. As soon as this end of the cotton roll has been placed in position the grasp of the thumb and index finger is relieved and the fingers are withdrawn. The traction with the index finger of the left hand is continued. The free end of the cotton roll is now grasped by the thumb and index finger of the right hand and is laid over the premolars. The cotton roll having been placed in its position, the index finger of the right hand is passed back as far as the third molar and with it one makes pressure on the cotton roll, packing it well up in the space between the cheek and the mucous membrane covering the alveolus. The packing having been completed, the traction is relieved by the index finger of the left hand, and the cheek is allowed to return to its normal position. The patient is now instructed to open the mouth wide and a roll of cotton is placed on the lingual surface of the teeth which have been covered on their buccal surface. The cotton roll having been placed on the lingual surface the patient is now instructed to close the mouth for the same reason as described for the placing of the cotton roll in the anterior superior position of the cotton rolls.

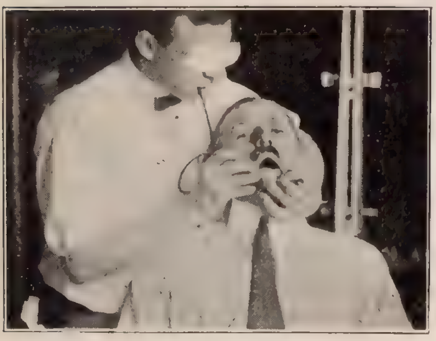


Fig. 16.

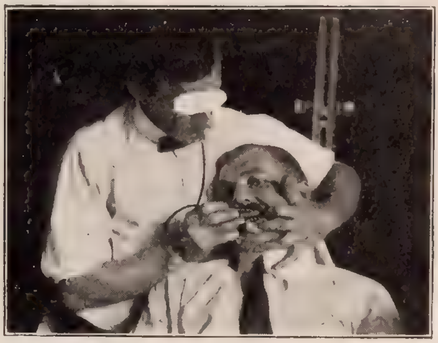


Fig. 17.

No. 16—Showing the position of the fingers of the left hand and the position of the hand holding the pipette.

Having described the preparation of the parts of the maxillae for treatment, the next step is to describe the preparation of the parts of the mandible. The index and second fingers of the left hand are placed far down in the space between the lip and the alveolus and with them one makes traction, the lip being pulled as far down as possible. The parts are thus exposed. A cotton roll is then grasped by the thumb and index finger of the right hand and is placed between the lip and the alveolus. As soon as the cotton roll is placed in this space the grasp of the thumb and index finger is relieved and the index finger is used to press the cotton more firmly in place. This step having been completed, the next one is that of relieving the traction of the lip with the fingers of the left hand and allowing the lip to come up over the cotton roll. The lingual surface opposite to the area which has been covered is treated as follows: The patient is instructed to raise the tip of the tongue to the roof of the mouth, and on so doing the cotton roll which is held by the thumb and index fingers of the right hand is placed in position back of the teeth. As soon as the cotton roll is in position the patient is instructed to place the tongue on the cotton roll. One now observes that the cotton roll is practically covered by the tongue, to insure the safety of the surface of the crown of the teeth. The cotton is grasped by the points of the thumb forceps and is dragged up from under the tongue until the lingual surface of the crowns of the teeth are protected by the cotton.

Having described the technic for the protection of the approximating tissues of the anterior inferior teeth, let us now study the technic for the protection of the parts distal to the canines. The first step is that of placing the cotton roll on the lingual surface of the teeth between the gum and the mucous membrane covering the alveolus and gum at the gingival margin. A cotton roll is grasped by the thumb and the index fingers of the right hand, while the index and second fingers are used as retractor for getting the tongue out of the way. As soon as the space between the tongue and the alveolus can be seen without any interference, the thumb and index finger holding the cotton roll are passed far back in this space. The traction of the tongue is relieved and the tongue is allowed to cover the cotton roll. Again we note that the cotton is practically covered by the tongue, and that to insure the tissues we must cover the parts with it. Thus we take the thumb forceps and carefully draw the cotton up from under the tongue and place it around the crown of the teeth. The cotton roll having been placed on the gingival surface, the next step is that of placing one on the buccal surface to protect the mucous membranes of the alveolus and cheek and also the gum. The patient is instructed to close the mouth, after which traction is made with the index finger of the left hand while a cotton roll is grasped by the thumb and index finger of the right hand. The thumb and index finger are passed far back in the buccal space, and as soon as the parts are well covered the cotton is placed on the tissue and the fingers are removed. The free end of the cotton roll is then placed in position, after which the cotton is packed in place with the index finger of the right hand. These steps having been completed the traction with the finger is relieved and the cheek is allowed to return to its original position.

We have now learned the technic pursued by the author for the preparation of the parts preparatory to the use of the pipette for the application of the desired drug in the pocket. And now we are ready for the next step, namely, the actual technic of application with the pipette. For the application of the drug in the pockets of the anterior superior teeth, the position of the operator is to the right and back of the patient. The index and second fingers of the left hand are used to raise the cotton roll out of the way and at the same time expose the parts clearly to view. The rubber hose attached to pipette is held between the lips and the charged pipette is held firmly between the thumb and the index finger of the right hand. The hand is made steady by resting the third and fourth fingers on the chin. The point of the pipette is then passed into the pocket and is gradually passed downward until it is in the deepest portion of the pocket. Gentle pressure is then made, and the instant that the fluid contained in the pipette appears at the gingival it is gradually withdrawn from the pocket. The traction of the fingers is relieved and the lip allowed to settle, and by so doing it forces the cotton over the crowns of the teeth and thus protects them.

The technic for the application of the posterior superior teeth is the same as described for the anterior superior teeth.

The position for making an application of the anterior inferior teeth differs from that of the superior teeth, in that here we pass the arm around the head of the patient and make traction with the index and second fingers of the left hand, and at the same time hold the cotton in position with the thumb. The pipette is firmly grasped by the thumb and index and second fingers of the right hand. The rubber hose is held between the lips, and the third and fourth fingers are rested on the chin to make the hand holding the pipette steady. The point of the pipette is now passed into the pocket and is gradually passed downward into the pocket until it reaches the deepest portion of it. When this point is reached gentle pressure is made on the end of the rubber tubing held by the lips and the content of the pipette is dispatched into the pocket. As soon as the drug appears at the gingival margin the pipette is withdrawn from the pocket and the traction exerted by the fingers is relieved by their removal, and the lip allowed to return to its position.

The technic for making an application with the pipette into the pockets of the teeth distal to the canines in the mandible is the same as described for the anterior teeth, with the exception that the thumb is held out of the way, and the traction is made with the index finger of the left hand while the second finger holds the cotton in position. The pipette is held in the same manner as described for holding the pipette for the anterior inferior teeth, and the mode of application is likewise the same.

This method for the application of drugs into the pockets around the roots of teeth affected by pyorrhea alveolaris offers the following advantages: First, the method is not an expensive one; Second, the method causes very little pain; Third, the technic is very simple and does not require a lot of complicated apparatus; Fourth, one is at all times working with a sterile piece of apparatus; Fifth, the contents of the pipette are at all times under the absolute control of the operator; Sixth, the quantity of the fluid can be controlled by simply mensurating the caliber of the pipette; Seventh, with this method the operator is able to reach the deepest portion of the pocket; acids as well as drugs can be applied with the pipettes with no loss of apparatus to operator; Eighth, little trauma is produced with pipettes as a means for applying any drug or acid.

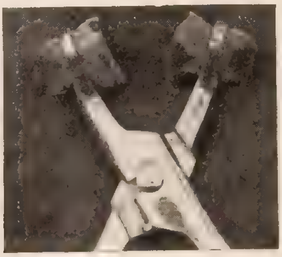
BACKING FLAT-BACK TEETH

BY C. H. WOOLGAR, M.D.,D.D.S., MAGDALENA, NEW MEX.

The forceps here illustrated I have used with good success to adapt gold plate to the back of flat-back teeth.

The forceps is made from a pair of bone-cutting forceps; fenestrate each beak; into each opening a piece of soft vulcanite rubber is inserted, one has a flat and the other concave occluding surface; the concave surface receives the convex surface of the face of the tooth.

The tooth is placed in the forceps, pins pointing upward, the gold is placed over the pins. One closure of the forceps will accurately adapt the gold to the tooth.



If pins are not pointed they should be made pointed by cutting ends off diagonally with a pair of shears. Teeth with short pins are equally as satisfactory to adapt backing to as teeth with long pins. Vulcanite teeth with platinum pins may be used satisfactorily in bridge-work. If tooth is one of the six anterior teeth the back of tooth should be ground to produce as near a flat back as possible; grasp head of pin with small flat nose pliers; a few partial rotations of the pliers will reduce the head of pin to the diameter of the shaft of the pin. The tooth is as strong as a flat-back tooth, and with backing forceps nearly as easy to place gold backing on.

The use of a vulcanite tooth in the place of a flat-back tooth is a great convenience in an emergency to the dentist who is not located near a dental depot.

PAIN ELIMINATION, ITS USES AND ABUSES.*

BY F. R. HENSHAW, D.D.S., INDIANAPOLIS, IND.

THE CENTURY DICTIONARY gives as a definition of pain: "Uneasiness or distress of body or of mind, bodily or mental suffering." A well known writer says that, "pain is not itself abnormal but is Nature's protest against the abnormal. It is not the sufferer from pain who is in evil case, so much as he who has lost his ability to feel it. Insensibility of this kind is often a grave symptom."

It is difficult and perhaps impossible to differentiate the part played in the expression of pain by the mental attitude of the individual. We have all admired the fortitude of the Spartan lad who held the wolf under his cloak while it gnawed his vitals, rather than expose his theft, and yet, his training had been such that he was doubtless able to mentally eliminate the torture of the wounds being inflicted, his pain-sense being perhaps but little developed.

The patron saint of dentistry, Saint Appolonia, underwent the torture of having her teeth torn from their sockets one by one, rather than renounce her religion, and her fine frenzy of zeal doubtless dulled the pain that to the ordinary individual would have been unendurable.

The quality of pain rises as the scale of organization of the individual becomes more complex.

The worm, trampled under foot, writhes and squirms, but its action is only muscular spasm and not an expression of pain, because it has no brain to record a mental process; the lynx caught in the trapper's iron-jawed trap, gnaws its leg away and making its escape, goes about its manner of life with little interruption, its mental processes being but little disturbed. Not so with the man-animal. His organization is the highest in Nature—his processes are all more keenly connected to his mentality—and so the mental processes are aroused and stimulated as in none of the lower orders. His sense of pain is keener and he reacts more strongly to it. Yet without pain the possibility of the survival of man kind would be extremely problematical as only by the over-stimulus of the sense of touch or the warning of abnormal sensations would the individual be able to ward off bodily injuries which might even cause death.

In the earliest recorded history, mankind has endeavored to alleviate pain. Primitive man knew that a sprained ankle held in the cool waters of the brook soon lost its hurt and by binding cool green leaves upon bodily wounds they came to know those which actually possessed therapeutic value. Inseparably connected with the treatment of physical distress is the superstitious belief in "spells," "charms," "amulets," "incantations" and "magic," and it was but natural that the practice of medicine should have had its orgin from the priests of the Egyptian and the "medicine man" of the barbarous tribes of all ages.

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*Read before the First District Indiana Dental Society, 1915.

Nor can we deny that those same charlatans who played upon the ignorance and superstition of their followers were wise in their knowledge of the psychological affect that their mummeries would produce. After all it is not such a far cry from the peasant who paid his few pence for a dirty bag containing a serpent's tooth which was guaranteed to prevent the attacks of the plague, to the person who calls up over the telephone and has his aching tooth treated at long distance.

It is an old saying that a "burned child" dreads the fire and it applies both to the physical as well as the mental state. Because they are known to produce pain our experiences have taught us that certain things are to be avoided. The little boy who eats a stomach full of green apples and is doubled up with colic while his anxious mother plies him with remedies, is likely to look with disfavor upon a whole tree full of "green ones" in the future.

Surgery and medicine were the outgrowth of the demand that some one in each community be equipped with the skill to relieve those who were the victims of accidents or disease and, as has been suggested, was so admixed with superstition and mysticism that even to this day some of the remnants of these may be found clinging to the hearth-stones of every community.

The first attempts at the use of anesthetics was as far back as the days of Hippocrates who describes certain concoctions that are to be administered to induce sleep as a respite from pain.

We do not need go over the history of the various means employed for the purpose, as one and all failed to produce insensibility to the pain of surgical operations until Horace Wells discovered that by causing a patient to breath nitrous oxid gas, he could produce a state of insensibility during which the most painful operations could be performed without the patient experiencing the least inconvenience. Then came chloroform and ether and the way was paved for the wonderful strides that have been made in the surgery of the last half century. Then came the introduction of local anesthetics making it possible to eliminate pain from localized areas. For many years the principle dependence of the professions was upon cocain but because of the dangers attendant upon its use many attempts were made to produce a substitute which should possess its anesthetic properties but not its dangerous qualities. Many were the drugs that came and went only to leave the field still occupied by cocain until one day a group of scientific men compounded a drug which they called novocain, and which was found to have all of the anesthetic properties of cocain with only one seventh its toxicity and none of its habit-forming qualities.

So, now we have in our hands the means for the elimination of pain; let us see what we will do with them.

In the first place, let us go back a little. Some twenty-five years ago a man by the name of Hale announced to the dental profession and to the public that he had evolved a method whereby the preparation of cavities in teeth could be performed without pain. He proposed to sell his "secret" to such dentists as wanted it, limiting the divulging of the process to one man in each community so that he might have a monopoly.

Imagine such a thing today. However, so anxious were the dentists for a method whereby their operations might be less painful that many flocked to Dr. Hale and paid him his price for his so-called method.

Dr. Hale was not a fakir. His method consisted of drying the cavities with a gentle blast of warm air passing over one of the essential oils which, becoming volatilized, was carried into the tooth cavity. It is now recognized as one of the principles of filling operations that a dry tooth gives less pain under operation than a moist one, so while the so-called Hale method did not produce painless operations it did much to alleviate the pain.

Following the Hale method came Cataphoresis which consisted of the production of osmosis of a solution of cocain through the dentinal tubules by means of a graduated current of electricity of low voltage.

Cataphoresis was successful in many instances in producing anesthesia but because of the delicate structure of the pulpal tissue, the introduction of any foreign substance became an element of great danger and such a trail of dead pulps followed its use that it was soon abandoned by the profession as a whole. So with high-pressure anesthesia through the tooth crown; the introduction of cocain into the pulp caused so large a proportion of disaster that this method also went into the discard.

All through these years of experiment the means for the elimination of pain in the excavation of teeth was right at our hands, and in the scramble for something new, was overlooked until within the past few years.

I refer to nitrous oxid and oxygen, administered in such mixture as to produce analgesia, which means absence of pain. To Dr. Charles Teeter, of Cleveland, Ohio, we are indebted more than to any other person for the development of the technic of administration of nitrous oxid and oxygen, not only for the production of analgesia for such short operations as the excavation of a cavity in a tooth, lancing abscesses, opening boils, opening into live pulps and other minor operations but for complete anesthesia for the extraction of teeth and all the operations of major surgery.

General surgeons have adopted the use of this method for the preliminary anesthesia in the majority of their operations, thus avoiding the usually attendant ether nausea, and many operators depend upon it for the entire operation.

The dentist who extracts teeth finds in this method the safest and surest means of eliminating the pain and terror of his operations.

I know I shall place myself in danger of the scornful wrath of Dr. Hermann Prinz, of Philadelphia, when I add one more to the means for eliminating pain from sensitive teeth, but my *clinical* experience as well as that of other men in whom I have the greatest confidence, in spite of Dr. Prinz's scientific deductions, leads me to say, that when used with good common sense and proper and careful technic, as prescribed by Dr. John P. Buckley, the desensitizing paste containing formalin and neothesin will temporarily desensitize the dentinal fibrils, will not and cannot produce devitalization of the pulp, and that the area affected, in course of time, will return to its normal state of sensibility. Please note my qualifications as to "good common sense and proper, careful technic."

With these three agents, novocain, nitrous oxid and oxygen and a desensitizing paste in the armamentarium of the dentist, his patients have a right to expect and exact that his operations be done without pain.

What are we going to do about it?

The quack has for many years advertised himself as "Painless Parker." It has been his catch-penny and so far as I am able to learn, the only thing that is done by the quack is to ignore cavity preparation, leaving the carious matter in place, and in this manner producing no pain, regardless of after consequences.

Of course such practice as this can result in but one thing, the continuance of the carious process, the recurrence of pain and ultimate loss to the patient.

We do not need to advertise ourselves as "Painless Parkers." If we will but do that which lies in the hands of each one of us to do, our patients will rise up and call us blessed. Our patients do not want to be hurt nor do they desire to be fooled as so many are fooled by the so called "painless dentists."

There is absolutely no possibility of our being confounded with the quack if we put into practice the things we have been taught for the alleviation of pain. It will give us the opportunity to do for our patients operations that, because of either the sensibility or timidity of the patient, we have heretofore been entirely unable to perform.

The cautious man immediately conjures up the bugaboo of the danger of encroachment upon the pulp because of there being no pain response, but careful attention to the detail study of our dental anatomy, a little of which I dare say would be good for the best of us, will soon relieve him of this anxiety.

I like the conservative man. He is the balance wheel of the earth. I do not like the ultra-conservative who not only stands still but wants every one else to stand still. I am sometimes at a loss to analyze the attitude of men whom I otherwise know well, when it comes to the matter of the use of anesthetics.

In a group of well known dentists a short time ago a discussion arose as to the merits of anesthesia and analgesia and to my surprise two thirds of the group used neither novocain nor nitrous oxid. All were solid, substantial and successful men and I am at a loss to know the reason for their attitude.

Some time ago a patient came to me from one of these men. He was his patient and he was very fond of him as a man and a dentist, he had a high respect for his ability, but in spite of my arguments refused to go back to him because he would not eliminate the pain during his operations.

This man wanted to pay good fees, he wanted good service, and he would not submit to pain when he knew it could be avoided. Do you blame him?

This is but one of many instances. The intelligent patient of today knows that means can be employed to alleviate the suffering of dental operations and if you are not equipped to meet his demands he is justly entitled to seek some one who is.

The dentist has always been more kind to his patients than the surgeon, oculist or rhinologist.

Who has not heard of the oculist who ruined a bushel of eyes in learning to operate successfully for cataract, of the rhinologist who had clipped hundreds of adenoids before he became skillful enough to completely remove them, or of the surgeon who has sewed up a belly only to find that he has left something inside?

Our mistakes are not so gross as that and as our technic is delicate so is our attention to the detail of pain production more keen.

One has but to watch a sub-mucous operation on the nose or the enucleation of a tonsil under local anesthesia, the usual method, to feel assured that the average dentist does not compete as a pain producer. The dentist must acquire a delicacy of touch and a fine knowledge of tooth anatomy to be able to qualify at all in the practice of his art, and as the patient is always in position to enter complaint of discomfort or pain, it naturally follows that he must acquire all those details of technic that tend to make his operations least painful. If we add to this skill the administration of one of the above-mentioned means of pain elimination it readily will be seen that he must be accorded high rank in the healing art.

When I began this paper, I thought I knew of many abuses that could be enumerated of the methods for elimination of pain, but as I reflect on what the wonders of our methods can produce for the relief of the patient and the comfort and satisfaction of the operator I am constrained to sum up all the abuses, except that of the quack who merely advertises that which he does not perform, in a single phrase which, when analyzed, will give us I believe the sum total of all possible abuses and about which several volumes could be written.

The sum of all abuses is "*lack of knowledge and faulty technic.*"

No one would advise an individual to make use of any general or local anesthetic unless he had thoroughly acquainted himself with its characteristics, its properties and its effect on the various organs, nor would any individual be justified in undertaking its use until he had learned by observation and study the technic of its application.

You would not place fire-arms in the hands of a child nor warfare in the hands of grown ups; but neither would be more absurd than expecting the proper use of anesthetics in the hands of the untrained.

Much has been written in recent months of the disastrous affects attendant upon the use of Buckley's desensitizing paste. I hold no brief for Dr. Buckley, although he is my good friend, but I venture the suggestion that a very large percentage of all the troubles that have been attributed to this preparation have been due to a complete ignoring of the very exacting rules of technic that were laid down by Dr. Buckley in the first instance. No remedy may be taken as a panacea and this one is no exception to the rule.

The same may be said of any anesthetic. When you have trouble with novocain, look over your technic and if you will be honest with yourself you will usually find the fault in your own hands.

The man who tries any of these methods and gives up at his first failure is merely cheating himself and his patient of the greatest boon that has come to our profession in years. He should at least give himself and the agent employed the benefit of the doubt.

Summing it all up it is my conclusion that if the proper preparation is made in acquiring a knowledge of the principles involved there need be no abuses of the elimination of pain.

DISCUSSION.

F. J. Prow: It affords me great pleasure to be present with you all at this meeting, and have the opportunity of listening to this most excellent paper. It is a subject of vital importance to us all. One which should and does interest us. The alleviation or elimination of pain has been written and talked about, and in turn discussed privately and publicly for many years. In the days when Dr. Henshaw and myself entered the profession, cataphoresis was in its glory. We all thought we had found a successful method. I had the fortune, good or bad, to be among the first patients to have it used upon. Dr. D. A. House, of Indianapolis, who was to have been with us was the operator, and myself the victim. During the application, we had the misfortune of letting the contact break with the shock attending, which, if any of you never experienced, you should just——, well, just for experience. I should add that it did do the work, but the process of its administration was more disagreeable than the pain occasioned without its use, to me.

Cataphoric outfits were sold by the hundreds, for the majority of dentists had some form of outfit. I should say, along with the rest, I had an outfit.

As Dr. Henshaw says, this method died a natural death. In 1896 there was a method used called "Herbst Dental Obtundent," consisting of sulphuric acid, one drachm; cocain thirty grains; sulphuric ether, three drachms. This was limited in its use to comparatively few operators, and well it should have been. The sulphuric acid was certainly harmful. About the time I entered the profession, some one, I cannot recall who, was advocating the inhalation of chloroform out of a bottle during excavation. I remember Dr. Hacker, of Indianapolis, used it; also Dr. R. A. Adams, now of Denver, Colorado, quite a great deal. While we were taught this was a dangerous procedure as patient should be in a reclining position when chloroform was administered, and should only be given when the stomach was empty, etc., and last but not least, in case of an accident the dentist would likely have been severely censured by the medical profession, if nothing worse. Yet, with all these things to face, some men successfully used this method. I plead guilty to having used it in a few instances, with success. I recently quite successfully used it on a patient who was a trained nurse, understanding its administration and effects.

Then came later the injection of cocain by means of a high pressure syringe, heralded by its friends as the finest thing ever. As Dr. Henshaw says, results proved its fallacy and it passed from use. Cocain injections around the teeth in the gums, has been and is still used with varied degrees of success and failure. In some measure being similar to conductive anesthesia. Then came a few years ago the administration of nitrous oxid and oxygen, hailed by its advocates as the coming of millennium's dawn as a pain reliever in all dental operations.

Expensive complicated outfits were bought by the hundreds, many using them successfully and obtaining excellent results, many others decorating the corner of the dentist's operatory unused.

Shortly after the coming of nitrous oxid and oxygen analgesia comes, the new and latest, "the real thing" Conductive Anesthesia. Even the most ardent supporters of nitrous oxid analgesia, in a great measure deserted to the new god.

Briefly outlined, these have been the varied changes in methods of relieving pain promoted and practiced with greater or lesser success in the past twenty-one years of which I have been interested in the dental profession.

Now, for a more pointed discussion and expression upon these various methods:

First: Herbst method did alleviate pain but was harmful to the tooth structure. Therefore should not be used at all.

Second: Chloroform inhalation does do good, and, under proper care, bad results are not likely to occur. To its use each of you will have to personally answer as to your judgment of the attendant risks and your liability in case of accident.

Third: Sharp instruments, skillful manipulation, blasts of warm air thrown into cavities previously saturated with some essential oil, phenol, or chloroform, evaporating same, will assist you in many cases. This we can all endorse.

Fourth: Use of high pressure syringe injecting cocain is doubtful procedure and endorsed by few of the profession at this time.

Fifth: Cocain injection around surrounding tissues of tooth is used by a great many with varying results and degrees of success. Not generally endorsed by the profession.

Sixth: Cataphoresis, while successfully used by many, and I think still used by some very few men, has passed from general use.

Right here I am reminded of a little incident: In the winter of 1897, I was out looking for a location, and among other places I visited was Kokomo. I went in to see our old friend, Dr. S. T. Kirk, who has passed to the great beyond. He says "Young man, you are the very fellow I am looking for," slapping me upon the back. "I want you to grind down this upper molar for me for a gold crown, and use cataphoresis." I had never manipulated a cataphoric outfit, and you can imagine my feelings as I started the job. Well, we got through, and successfully too, strange to say. We were both thankful when it was over. I used this method quite a few times with varying degrees of success, and finally abandoned it.

Seventh: The desensitizing paste of Dr. Buckley I have used only a few times. It has some objections. One is, you must have a cavity of sufficient depth to seal it in with cement, to confine it to the cavity, and must in many instances remove quite a bit of decay before it can be placed. Take in shallow cervical cavities, the very place needed most, and its use is difficult. In such cases a little more moral suasion and suggestion, accompanied with sharp instruments and skillful hands, and it's *all* soon over. However, I want to say there are cases where we may use this desensitizing paste successfully and we should use it.

Eighth: Nitrous oxid and oxygen. I would like to speak of two personal experiences: Dr. Barbour, of Chicago, who is conceded to be an expert in the use of nitrous oxid and oxygen and suggestive therapeutics, gave a continuous clinic at one of our state meetings, as many of you saw and remember. He also gave a private clinic at Dr. Henshaw's office to some six or eight persons, at which I had the privilege of being present. The patient was Dr. M. A. Mason, of Ft. Wayne. I watched this case carefully and was impressed that the results were not ideal; and as I remember, Dr. Mason expressed himself in like manner.

About two years ago, Dr. Henshaw excavated two large cavities for me, preparatory to placing large gold inlays, saying to me, "Fred, we'd better have a little N_2O" and I agreed. When it came to the second cavity we did it without analgesia, and during the administration and preparation of both cavities I tried to pass unbiased judgment upon the method. I formed the conclusion that to me, personally, the annoyance of and the time consumed for the use of the nitrous oxid and oxygen was about equal to the increase of pain in the cavities where not used. The pain *is relieved without question*, but the attendant buzzing, disagreeable noise of the engine is, if anything, magnified, and to many people, I imagine, would not be the success expected or desired for that reason. Those of you who have experienced its use upon yourselves should speak out and tell your experiences. I think such discussion would be very profitable to us all.

CONDUCTIVE ANESTHESIA WITH NOVOCAIN.

Ninth: At the big meeting at Chicago two years ago when conductive anesthesia was just being born, I saw the general clinic given, also was present with several others at a private clinic given by Dr. McLain. I was impressed at the time of the accurate knowledge of the necessary technic for a successful use and the grave attendant dangers of failure to observe same. Dr. McClain impressed this fact upon us decidedly, and at that time, and I might say even yet, I question its use in the hands of anyone who is not of the most painstaking nature and observant of all technic to the letter. I regard the passing of the needle along the bone for say an inch or more and depositing the solution at proper point at, or adjacent to the foramen one requiring great skill and judgment. It does seem to me, even with observance of surgical cleanliness as far as possible, there is danger of infection of the periosteum as your needle glides along the bone, or at the foramen where you make the final injection. And if an infection should occur at the foramen, would it not be grave? How can the operator keep the mouth dry and free from contamination during this operation, if he has no assistant? Take a mouth where the discharge of saliva is profuse. I have seen a number of clinics where conductive anesthesia has been used successfully, and plead guilty to having been one of the many to hold back and await the passing of its experimental stage. I wish right here to raise the point that an operator who has not an assistant is surely handicapped, if not barred from its administration.

At the Indiana Dental College last week, the demonstrators were looking for some one to come and see a peculiar condition of a patient following the use of conductive anesthesia. The patient had half of the tongue and face still paralyzed after some forty-eight hours had passed. Dr. Henshaw likely heard of or saw the case. I did not, but would like to know what the outcome was. I should like to raise the point as to whether, in the judgment of those experienced in its use, the anesthesia produced permits the operator to work sufficiently more rapidly as to compensate for the extra time used in its administration. The clientele of many men working in rural districts are not able to pay proper fees, and if this added expense is attached, might in some instances prohibit its use. I should like an expression on this point.

I agree with Dr. Henshaw as regards the conservative man. He says they are the "balance wheel of the earth." He says he does not like the ultra-conservative man. I would add this: Neither do I like the ultra-scientific man. There is a happy medium. Dr. Henshaw lightly touched upon psychological effects of suggestion. I am a firm believer in the practice of suggestion.

It is, in my judgment, a foolish bugaboo to say that in the use of any of the anesthetics it will make us liable to encroach upon the pulp. In this I heartily agree with Dr. Henshaw. All we need to know is the anatomy of our tooth and observe it as we work. I do not depend upon the sensation to patient, but upon my view of the cavity.

To sum it all up, I have been better impressed with the effectiveness of conductive anesthesia than any other method that we ever have had. Nitrous oxid and oxygen, I would place second.

In conclusion I wish to say there are many things to demand our greatest care and consideration in the use of these eliminators of pain to dental operations. We must have absolute observance of technic and the most thorough knowledge and skill at our command.

And after all, is it not true that the skillful, thoughtful, earnest operator with sharp instruments and careful hand, wins a great portion of the battle, either with or without anesthetics.

NEW LEGISLATION AFFECTING THE ARMY DENTAL CORPS

THE CONFERENCE COMMITTEE'S REPORT upon the Army Reorganization Bill was agreed to by the Senate May 17th and by the House May 20th.

This is the first of the general defense program bills to pass Congress. Incorporated in this bill is the following provision relating to the Army Dental Corps:

"The President is hereby authorized to appoint and commission, by and with the advice and consent of the Senate, dental surgeons, who are citizens of the United States between the ages of twenty-one and twenty-seven years, at the rate of one for each one thousand enlisted men of the line of the Army. Dental surgeons shall have the rank, pay, and allowances of first lieutenants until they have completed eight years' service. Dental surgeons of more than eight but less than twenty-four years' service shall, subject to such examination as the President may prescribe, have the rank, pay, and allowances of captains. Dental surgeons of more than twenty-four years' service shall, subject to such examination as the President may prescribe, have the rank, pay, and allowances of major: *Provided*, That the total number of dental surgeons with rank, pay, and allowances of major shall not at any time exceed fifteen: *And provided further*, That all laws relating to the examination of officers of the Medical Corps for promotion shall be applicable to dental surgeons."

It will be noted that this does not contain all the recommendations submitted by the Legislative Committee of the National Dental Association and strongly championed by them, as well as the many loyal supporters from all sections of the United States. However, it should be recognized that all legislation, especially when it becomes necessary for a Conference Committee to harmonize the conflicting provisions passed by the two branches of Congress, is more or less of a question of compromises and best results can only be expected when a sufficient number of the Conference members are friendly to the interests involved. Therefore, we feel that those who have been in close touch with all these circumstances will fully appreciate the situation and accept what has been secured as a very decided improvement over present conditions.

In this connection, and as a comparison, the following may be interesting: In 1901 Congress passed an act establishing an Army Dental Corps. The members of the Corps served as Contract Dental Surgeons until 1911, when, under specific conditions, Congress granted them the rank of first lieutenant. At the present time there are seventy-five members in this Corps, thirty-six first lieutenants, and thirty-nine Acting Dental Surgeons. Thus, it will be noted that two additional grades, with *actual rank*, have been added, and when this new legislation becomes fully operative, that is up to its full quota, there will be approximately two hundred members of the Corps, which is on a basis of "one to each one thousand enlisted men in the line of the Army." *Actual rank* has been intentionally emphasized, since there was a strong and persistent effort, upon the part of a majority of the Senate Military Affairs Committee, to deprive the members of the Corps of the rank of First Lieutenant. This attempted injustice was corrected by the Senate adopting the first and most important provision of Senator Pomerene's amendment; that is, actual rank.

In view of these changed conditions the future of this service will be decidedly more attractive and should not only strongly appeal to the dental graduates of today, but this should also stimulate the members of the Corps to develop it to its highest possibly efficiency.

For the benefit of those not familiar with the procedure in securing this legislation it may be very properly stated that this has not been accomplished without a vigorous fight and many sacrifices, upon the part of a goodly number of persons. Strong opposition, as well as some positive support, developed from sources least expected and in due time, we expect, as a matter of justice, to make a public acknowledgment to those who loyally co-operated in behalf of this legislation and made possible that which has been secured.

Respectfully submitted,
HOMER C. BROWN, *Chairman,*
Legislative Committee, N. D. A.

609 Hartman Bldg.,
Columbus, Ohio.
May 22nd, 1916.

Was he not kind to you, this dead old year?
Did he not give enough of earthly store?
Enough of love, and laughter, and good cheer?
It is nor well to hate him for the pain
He brought you, and the sorrows manifold.
To pardon him these hurts still I am fain,
For in the panting period of his reign
He brought me new wounds, but he healed the old.
—*Paul Lawrence Dunbar.*

EDITORIAL

NEW LEGISLATION AFFECTING THE ARMY DENTAL CORPS

After a strenuous campaign the dentists have succeeded in securing better legislation for the Army Dental Corps. The highest rank heretofore for members of the Corps has been First Lieutenant; the new legislation gives the ranks, pay and allowances of First Lieutenant, Captain and Major, and provides that all laws relating to the examination of officers of the medical corps for promotion shall be applicable to dental surgeons. This is a deserved recognition and the legislative committee of the National Dental Association, the secretary of the National Dental Association, and others who have worked unceasingly for the bill, are to be congratulated on what has been obtained.

The members of the dental profession generally are also to be congratulated for this new legislation gives dentistry an advanced recognition which it has earned.

Great credit is due Senator Atlee Pomerene, of Ohio, and Congressman Julius Kahn, of California, who rendered great aid in securing this legislation.

On another page in this issue we give the text of this new legislation and comment from the legislative committee of the National Dental Association.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

The Committee on organization of this new League consists of Dr. J. W. Beach, Buffalo, Chairman; Dr. H. A. Pullen, Buffalo, Vice-Chairman; M. B. Eshleman, Buffalo, Secretary-Treasurer. In a circular letter they are sending out they state that this movement is for the purpose of providing immediate aid for our war department when exigencies require, and will in no way conflict with present or future legislation affecting the Army Dental Corps.

Further they state that "the Preparedness League of American Dentists is organized to aid our Army Dental Corps by the voluntary service of its members, and its active usefulness will cease when the Army Dental Corps becomes adequate to meet the demands upon it.

It is primarily a registration bureau for all dentists of the United States who agree to prepare the mouth of at least one applicant to meet the requirements for enlistment, subject to such rules as shall protect the dentist from imposition.

Registration entails no further obligation on the members than is herein stated. It is the desire of the organizers to be able to assure the Surgeon

General of the U. S. Army, not later than July 1st, 1916, that twenty thousand dentists have joined the League.

Furthermore, the Committee on organization has formulated a plan whereby those injured about the face and jaws during battle may receive skillful surgical and mechanical treatment by a Corps of dentists specially trained for such purposes.

Sections will be formed with units in many of our cities where instructions and clinics will be given in reference to Special Oral Surgery and Pathology; Reduction of Fractures; Construction of Splints; Bone Grafting; in short, such new conditions as have developed from the great war now raging in Europe. Dentists who have served at the American and other Ambulance Hospitals in Europe, and others of international reputation in their special branches, will assist in this work.

It hardly seems necessary to add that the organizers of the League receive no compensation for their services, the object being purely humanitarian in character. Therefore they feel justified in soliciting your earnest co-operation in a cause the motives of which must ring true and could be promoted only by American patriotism.

Members will be active and associate. To become an active member of the League, the application blank must be accompanied by one dollar ($1.00). An associate member may register with the League by forwarding the application blank without fee, full membership to be consummated upon payment of the fee when requested by the League.

This is a patriotic undertaking and should meet the immediate approval of members of the dental profession, and we would suggest that those of our readers who have not already communicated with the committee, do so at once.

A CORRECTION

In Dr. Hinman's paper published in May, several additions were omitted on account of delay in getting revised proof. On page 382, line 26, after the words, "none replied," add the words, *commenting on this Dr. Ottolengui says:* Also add the words *pulpless teeth* wherever the words *dead teeth* are used.

On page 382, last line, the word *in* should be *after*, and the word *having* should be *leaving*.

Page 383, third line the word *into* should be *beyond*. And in the thirteenth line eliminate the word *thus*, and add after *treated* the words, *by filling beyond the apex*.

> If our first duty is to give honestly of our knowledge, the second duty is to give fully.—*Dr. R. C. Buist.*

SOCIETY·ANNOUNCEMENTS

General Plan for the Twentieth Annual Session of the National Dental Association

While no sensational changes are contemplated in the general plan of this annual session of the National to be held in Louisville, July 25-26-27-28th, there are a number of decided improvements which will be inaugurated.

OUTLINE AND LOCATION OF SESSIONS

The first day will begin with registering all members and guests, at the spacious First Regiment Armory rotunda; such facilities will be provided as will make registration a pleasure. The ladies will register on the mezzanine floor of the Seelbach Hotel which will be their headquarters and from which all entertainments will start.

Opening session will be held in Keith's Theatre, seating over 3000 very comfortably. This theatre is artificially cooled to the temperature of 65 degrees during summer months, and of its acoustic properties Dr. Thomas Hinman had this to say, after a recent inspection: "Nowhere, with the exception of the Mormon Temple at Salt Lake City, have I observed such wonderful acoustic properties."

All general sessions and some special sectional meetings will be held in this theatre, which is diagonally across the street from registration headquarters, one block from Seelbach Hotel, and one-half block from the Watterson Hotel and Hermitage Hotel.

The splendid auditoriums of the Seelbach and Watterson Hotels will be used for sectional meetings as well as McCauley's Theatre, across the street from the Seelbach. Altogether there will be four sectional meetings in progress at the same time, so every phase of modern dentistry will be presented in the most approved manner.

Drs. Hinman, W. H. G. Logan, O. U. King and E. G. Link, of Rochester, while on visits to Louisville, expressed surprise at the fortunate arrangements of buildings in which the sessions could be held, for all hotels and theatres which will be employed are within the radius or length of two (2) city blocks; going from east to west, from Fourth street on Walnut, they are McCauley's Theatre, Seelbach Hotel, Henry Watterson Hotel, Keith's Theatre and First Regiment Armory where registration, exhibits and progressive clinics will be held.

NOTABLE CLINICS ON WEDNESDAY

Perhaps the greatest treat the profession has ever enjoyed will be provided on Wednesday afternoon when, under the supervision and direction of Dr. W. H. G. Logan, four hours and one-half will be devoted to "Illustrated Lecture Clinics," presented by men of acknowledged authority upon the subjects on which they are to speak.

This is a new feature of a National meeting and affords every member in attendance an equal opportunity to hear and see the same good clinics, and when the profession is assured that Dr. Logan has complete charge of this branch of the meeting it warrants us to expect something out of the ordinary.

MORE CLINICS ON FRIDAY MORNING

The great balcony of the First Regiment Armory will be divided into twenty-seven sections, each to seat from one hundred and twenty-five to one hundred and fifty members and visitors. There will be twenty-seven clinicians, divided into three branches of dentistry and the outline is so arranged that every man, by remaining in his seat, will see every one of the twenty-seven clinics in the morning allotted for this branch of the work. Much thought and careful study have been devoted to this work and it should be a strong feature in attracting the members of the National to this meeting.

ANOTHER ATTRACTIVE FEATURE

A feature of special interest to many members of the National will be the joint meeting of the Interstate Anesthetists, a strong body of both medical and dental men having special interest in anesthesia. A strong program for a joint meeting has been arranged, including the following men: Drs. Long, McMillan, Denman, Brophy, Riethmueller, Thoma and Yager, who will discuss the following subjects: "Oral Operations under Nitrous Oxide-Oxygen in the forward inclined sitting posture"; "Vapor Anesthesia for Oral Surgery"; "Intro-Oral Methods of Local Anesthesia"; "Extra-Oral Methods of Local Anesthesia;" "Handling Emergencies under Anesthesia and Analgesia in the dentist's office." After this session, which takes place on Wednesday at McCauley's Theatre, this organization will hold a three days' session in the Red Room of the Seelbach, to which all dentists interested in this useful branch of our healing art are invited.

SOMETHING ABOUT ACCOMMODATIONS

From some source the expression of fear has reached the Local Committee of Arrangements that Louisville did not have accommodations for a large meeting; to all such fearing friends we submit the following queries:

Do you know that Louisville has sixteen splendid hotels with a total of 3000 rooms, not to mention the score of lesser hotels for those who prefer to live modestly?

Do you know that Louisville's Y. M. C. A., Y. W. C. A., Y. M. H. A., can furnish quarters for hundreds of tourists who prefer that kind of accommodation?

Do you know that Louisville has entertained some of the largest conventions in the country in a most acceptable manner, notable among them the International Sunday School Association, with eight thousand registered delegates; The National Canners, with from three to four thousand delegates, have met in Louisville for three consecutive years in preference to other larger competing cities; the great "Saengerfest" which brought thousands to Louisville; Knights Templar, Shriners and a host of the largest gatherings of commerical, political and religious nature in America? This she would be unable to do were it not for her extensive hotel accommodations and genial southern Kentucky brand of hospitality.

"YOU'LL FEEL AT HOME IN LOUISVILLE"

This slogan is ever in the mind of the Entertainment Committee which is charged with the special responsibility of making every visitor to this convention feel perfectly at home. While this Committee is planning to work in harmony with the wishes of the officers of the National in that no special entertainment will be furnished the male attendants, because of the valuable time it consumes from the regular program, yet they will leave nothing undone to take care of the comforts of all who attend the meeting. Perhaps the greatest service they will render the dentists will be to thoroughly entertain the ladies.

A series of entertainments is being arranged for, with the assistance of a Ladies' Committee, composed of the wife of each Local Committeeman, which will so completely take up the time of visiting ladies that their husbands will be relieved entirely of the responsibility of providing entertainment. The word comes from this Committee, "Tell the boys to bring the ladies and we will take good care of them in true Kentucky style."

Among the entertainments for the ladies are the following: sight seeing auto trip with luncheon at the Country Club; boat ride upon the beautiful Ohio River; shopping tour through Louisville's handsome department stores; trip to Fountain Ferry Park with theatre party and lunch, and others.

"You'll feel at home in Louisville."

The Tennessee State

The Tennessee State Dental Association meets in Knoxville Tennessee, June 20, 21, 22, 1916.

H. C. MAXEY, *Secretary.*

Tennessee State Board

The next meeting of the Tennessee Board of Dental Examiners will be held at Nashville, Tennessee, commencing Monday at 10 A.M., June 12th, and continuing through Friday, June 16th.

For full information and application blanks apply to

DR. WALTER G. HUTCHISON, *Secretary*,
308 Eve Bldg., Nashville, Tenn.

Ohio State Dental Board

The Ohio State Dental Board will hold its 1916 June examination in the city of Columbus. The practical examination will commence Monday, the 26th, at 8:30 A.M., at Ohio State University Dental College, and the theoretical examination at 8:30 A.M., Thursday of the same week at Ohio State University Armory on the University Campus.

Ohio State Dental Board,
R. H. VOLLMAYER, *Sec'y., Toledo, Ohio.*

Program of the Section of Stomatology of the A. M. A.

DETROIT, MICH., JUNE 12–16.

TUESDAY 2 P.M.

1. Symposium on The Principles Involved in Chronic Mouth Infections in their Relation to General Diseases.

(a) Dr. Frederick B. Moorhead, Chicago, Ill.
(b) Dr. Frank Billings, Chicago, Ill.
(c) Dr. Edward C. Rosenow, Rochester, Minn.
(d) Dr. Ernest Irons, Chicago, Ill.

WEDNESDAY 2 P.M.

2. Symposium on Interstitial Gingivitis and Pyorrhea Alveolaris.

(a) Bacterial Findings........ Dr. A. W. Lescohier, Detroit.
(b) Anaerobies in Pyorrhea Alveolaris { Dr. Anna W. Williams. Dr. Caroline Rosenberg. Dr. Charlotte VanWinkle. New York, N. Y.
(c) The X-Ray in Diagnosis........ Dr. Hollis Potter, Chicago, Ill.
(d) The Importance of a Correct Differential Diagnosis of the Predisposing Causes........ Dr. M. L. Rhein, New York City.
(e) Some Studies in the Treatment of Pyorrhea Alveolaris. Dr. Geo. B. Harris, Detroit.

(DISCUSSERS)
Dr. Arthur Black, Chicago, Ill.
Dr. Joseph Head, Philadelphia, Pa.

THURSDAY 2 P.M.

3. Ankylosis of the Temporomandibular Joint.
Dr. Chalmers J. Lyons, Ann Arbor, Mich.
(DISCUSSER)
Dr. John B. Murphy, Chicago, Ill.
4. A Clinical Pathological Study of Malignant Conditions about the Face, Mouth and Jaws........................ Dr. John W. Means, Dr. Jonathan Foreman, Columbus, Ohio.
5. Surgical Procedures Enhancing the Retention of Artificial Dentures, with Report and Illustrations of an Unusual Case.
Dr. Herbert A. Potts, Chicago, Ill.
6. A Study of the Lymphatics of the Dental Pulp.
Dr. Frederick Noyes, Chicago.

Chairman—Dr. Frederick B. Moorehead.
Eugene S. Talbot, secretary.

North Dakota Board of Examiners

The North Dakota Board of Dental Examiners will hold its next meeting in Fargo, July 11th, at 9 o'clock and will continue four days.

All applications and credentials *must* be in the hands of the secretary July 1st.

For application blanks and information address

W. E. HOCKING, *Secretary*,
Devils Lake, N. D.

Where is the Oldest Dental Society in the World?

St. Louis, Missouri, enjoys this distinction in the St. Louis Dental Society, which was organized in 1856, and has been in continuous existence since that time. Its membership has included some of the leading dental scientists and is now composed of 300 enthusiastic workers who are planning to celebrate the Sixtieth anniversary with a rousing meeting November 16, 17 and 18, 1916.

The St. Louis dentists are preparing to make this meeting an important event in the dental history of the country and eclipse in interest and attendance all former efforts of local societies.

Besides the usual attractions, some of the most prominent men in the profession, men who are adding to the scientific knowledge of the world, will inculcate the progressive ideas which are so essential in modern practice.

To the members of all societies St. Louis extends a hearty invitation to be present November 16, 17 and 18, 1916, and assist in commemorating the passing of the sixtieth mile-stone in organized dentistry.

Arkansas State Board

The Arkansas State Board of Dental Examiners will hold an examination at the Marion Hotel in Little Rock, Arkansas, on June 29, 30, and July 1. Applicants must be graduates of reputable Dental Schools. Application and fee should be in the hands of the Secretary fully two weeks before the examination. For further particulars, address,

Dr. I. M. Sternberg,
Fort Smith, Ark.

California State Dental Association

The forty-third session of the California State Dental Association will be held at the Palace Hotel, San Francisco, July, 12, 13, 14 and 15.

We hope to make this an attractive meeting—men of national prominence have been secured. Our own members will present clinics on every subject of importance. A cordial invitation is extended to all who may be interested.

Exhibitors wishing space may secure information from the Secretary.

C. D. Gillman, *Pres.*
Oakland Bank of Savings Bldg.,
Oakland, Calif.

John E. Gurley, *Secretary,*
350 Post Street,
San Francisco.

North Carolina State Board

The next regular meeting of the North Carolina State Board of Dental Examiners will be held at the Battery Park Hotel, Asheville, N. C., beginning promptly at 9:00 o'clock on Monday morning, June 26th.

All applications must be in the hands of the secretary ten days prior to the meeting.

For further information and application blanks address the secretary, F..L. Hunt, Asheville, N. C.

South Carolina State Board

The next meeting of the South Carolina Board of Dental Examiners will be held at Jefferson Hotel, Columbia, S. C., beginning at 9 o'clock Wednesday morning, June 14th, 1916.

R. L. Spencer, *Secretary.*
Bennettsville, S. C.

National Association of Dental Faculties

The National Association of Dental Faculties will hold its next meeting at the Seelbach Hotel, Louisville, Ky., July 22 and 24, 1916.

Charles Channing Allen, *Sec'y,*
N. W. Cor. 10th and Troost, Kansas City, Mo.

Louisiana—State

At the thirty-eighth annual meeting of the Louisiana State Dental Society, held in Lake Charles the following officers were elected for the ensuing year: Paul N. Cyr, president; A. K. Fort, first vice-president; C. S. Tuller, second vice-president; J. Crimen Zeidler, secretary; J. A. Gorman, corresponding secretary; O. J. Ory, treasurer.

New Orleans was selected as the next meeting place and in view of the fact that a meeting is being planned comprising the dental societies of Alabama, Louisiana, Mississippi and Texas, this gives promise of being one of the largest meetings ever held in this part of the country in quite a number of years.

A program of unequalled excellence is being prepared, and efforts are being directed towards bringing to New Orleans some of the leading men in the profession,

Respectfully,
J. Crimen Zeidler, *Secretary.*

Rhode Island Board of Registration

A meeting of the Rhode Island State Board of Registration in Dentistry, for the examination of candidates, will be held at the State House in Providence, June 27, 28, 29, 1916, beginning each day at 9 A.M. Only graduates of a reputable Medical or Dental College are admitted to this examination. Each candidate must file with the Board and sign in the presence of the Secretary, a photograph of recent date. Each applicant must present in person his diploma for inspection to the Secretary of the Board.

William B. Rogers, D.M.D., *Sec'y.*
171 Westminster St., Providence, R. I.

Pennsylvania State Board

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in the Musical Fund Hall in Philadelphia, and the College of Pharmacy Building in Pittsburgh, on Wednesday, Thursday, Friday and Saturday, June 14, 15, 16 and 17, 1916. The practical work will be held at the Philadelphia Dental College in Philadelphia, and the University of Pittsburgh in Pittsburgh, on the first day, Wednesday, June 14; the operative work being held at eight-thirty A.M., and the prosthetic at one-thirty P.M.

It will be necessary for any applicant repeating his examination to take the practical work over as well as the theoretical. Application papers may be secured from the Department of Public Instruction, Harrisburg. For further information apply to Alexander H. Reynolds, 4630 Chester Ave., Philadelphia.

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing June 12th, and continuing six days. For application blanks and full particulars address Dr. Fred J.Prow, Secretary, Bloomington, Indiana.

Vermont Board of Dental Examiners

The next meeting of the Vermont Board of Dental Examiners, for the examination of candidates to practice in Vermont, will be held at the Statehouse, Montpelier, commencing at 2 P.M. on June 26, 1916, and continuing for three days.

To be eligible for examinations a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, and (3) a graduate of a reputable dental college.

Applications must be in the hands of the Secretary not later than June 16.

For further information apply to Harry F. Hamilton, Newport, Vermont.

Connecticut State Dental Association

The Fifty-second Annual Convention of the Connecticut State Dental Association will be held at the Hotel Griswold, New London, Conn., June 13, 14, 15, 1916.

Papers and clinics of unusual interest have been secured, which with the excellent accommodations offered by The Griswold, will make this the most attractive meeting in the history of this association.

ELWYN R. BYRANT, *Secretary,*
New Haven, Conn.

Michigan State Board of Dental Examiners

The next regular meeting of the Michigan State Board of Dental Examiners for the examination of applicants who may desire to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, June 19, 1916, at 8 o'clock A. M., and will continue through Saturday, June 24th.

For application blanks and all further information application should be made to

E. O. GILLESPIE, *Secy-Treas.*
Stephenson, Mich.

Wisconsin State Board

The dates have been changed for the Wisconsin State Board Dental Examination from June 14th to June 23rd, 1916.

F. A. TATE, *Secretary,*
Rice Lake.

Second Annual Meeting of the Interstate Association of Anesthetists

The Second Annual Meeting of the Interstate Association of Anesthetists will be held at the Hotel Seelbach (Red Room), Louisville Ky., July 26 and 27, in conjunction with the National Dental Association.

A splendid program has been arranged and a banquet will be served. For further information and dinner reservations address,

F. H. McMechan, M.D., *Sec.-Treas.*,
Avon Lake, Ohio.

Pennsylvania State Dental Society

The forty-eighth annual meeting of the Pennsylvania State Dental Society will be held in Carnegie Music Hall, Pittsburgh, Pa., June 27th, 28th, and 29th, 1916.

Special attention has been given to the selection of the essayists, who will give illustrated lectures upon very important subjects concerning the dental profession. Judging from reports of the various committees this meeting promises to be well worthy your attention.

A cordial invitation to be present is extended to all ethical practitioners.

J. F. Biddle
W. H. Haines
A. P. Lee
Program Committee

Believe and make the world believe, your jaw is set to win;
Believe (belief's contagious) that your ship is coming in;
Believe that every failure is brought about by lack of grit;
Believe that work's a pleasure if you buckle into it;
Believe there's help in hoping, if your hope is backed with will;
Believe the prospect's fairer from the summit of the hill;
Believe, with all your power, that you're sure of winning out;
Believe, keep on believing; they are brothers—Death and Doubt.
—*Strickland W. Gillilan.*

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVI JULY, 1916 No. 7

OFFICIAL ORGAN

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

ANCHOR LOOP AND SPRING ATTACHMENTS FOR PARTIAL DENTURES*

BY R. W. SWEETNAM, D.D.S., TOLEDO, OHIO.

> "Destroy not wantonly, God's handiwork, for He in love, wisdom and power created exceedingly well. He thus directs not only the way, but the ideal for our guidance that we may assist the afflicted and prevent disease. As the Master Builder put life into a tooth, may we fearlessly hazard to substitute a dead counterfeit and thereby waste its strength, beauty and usefulness to build over a possible sleeping volcano our contemplated improvement on the Lord's creation?"

IN ORDER TO MAKE this report brief and easy to understand, I will at present, describe only my typical anchor loop with spur, as used in supplying the upper and lower second bicuspid and molar teeth.

This vertical loop attachment meets the requirements of these cases especially so well that, after considerable experience with other attachments, I originated this one and use it, or some of its modifications, in most cases where anchor dentures are indicated, and also for removable bridge work, in order to avoid mutilating the abutments and to conserve the pulp and other tissues, as well as the health of the patient.

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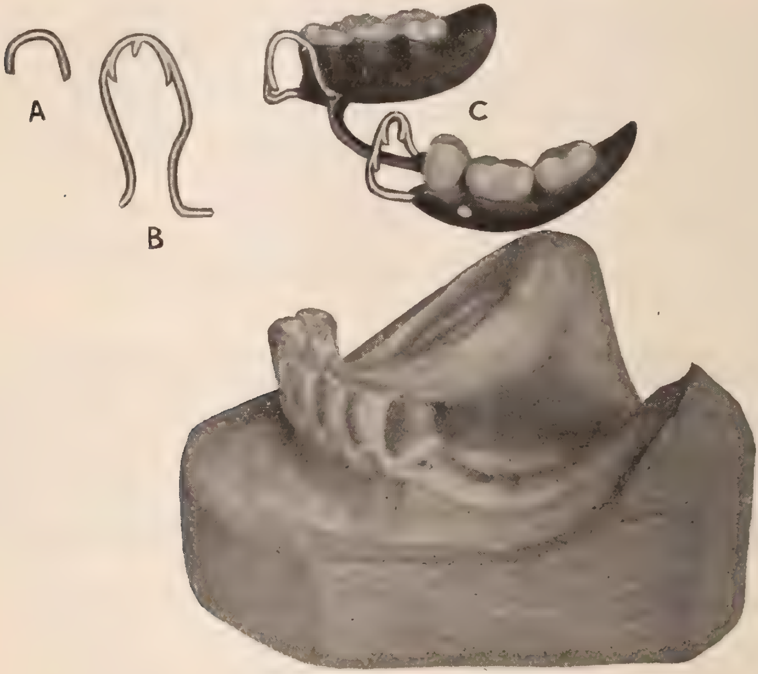
*Clinic, Ohio State Dental Society, Dec., 1915.

Given sound, or nearly sound teeth for anchorage or abutments, in my opinion no other attachment will satisfy the conservative, accurate dentist so well as this, enabling him, as it does, to meet the needs of his good patients, in a manner entirely satisfactory to them and to himself.

The reasons for my opinion of the value of this attachment are many:

First: No precious dental tissues are needlessly removed, and the healthy condition of the tissues involved is maintained.

Second: Because the anchor tooth receives stress naturally. This is a very important consideration, and one not fully appreciated by all members of the dental profession. It is one of the features of the loop that is sure to meet general approval when once it is perfectly understood.



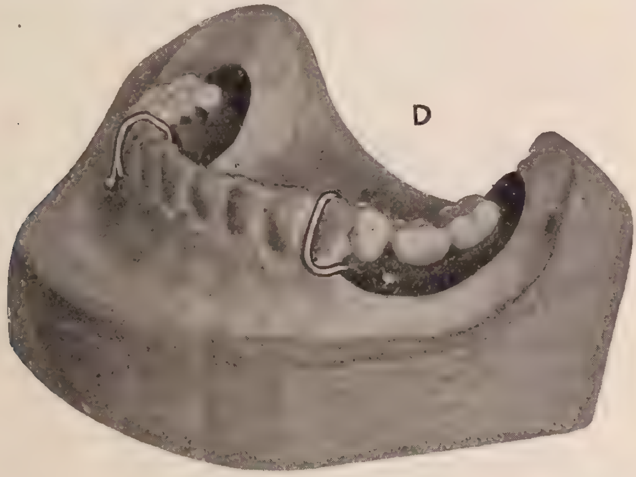
Third: Settling is provided for, while the stress remains as nature intended—in line with the long axis of the tooth.

Fourth: Interdental space is provided and maintained.

Fifth: Rear settling, which may take place, can be remedied easily, without reconstruction. The loop releases to meet conditions in use or after settling, as may be required.

Anchor attachments largely in use at present—except those in the construction of which the crown of tooth is removed and with it the pulp—place the stress distally, and are therefore defective in this respect. Another objection to some of them is, that they are difficult to restore to efficiency after settling, without reconstruction, if, indeed, it is possible to do so at all. This statement refers to the anchor teeth as well as to the denture.

To construct this anchor loop, etc., you may proceed about as I now direct. Study, for a moment, the method shown in Figure A and, in the manner shown, fit vertically the mesial third of the crown of each anchor-tooth over the lingual, occlusal and buccal surfaces, usually not quite to the gum-line, with a round, high-fusing clasp wire, high percentage iridio-platinum (20% iridium), or other suitable spring clasp wire, twenty gauge, so as to engage or grasp the anchor tooth, which is not ground at all. Any grinding necessary to accommodate this vertical loop is done on the tooth which occludes with anchor tooth and wire. Sometimes no grinding for accommodation is necessary, but usually some is required. The necessary grinding is likely to be of enamel only, on a surface not subject to decay; easily remedied by filling at any rate, should you be obliged to "cross a bridge when you come to it." There is no sensible cause for alarm on this account.



I will repeat with emphasis: *No grinding on anchor teeth*, and on occluding teeth only sufficient to accommodate wire in closure of jaws and masticating.

If occluding tooth is porcelain, liberal grinding of porcelain to accommodate loop and prevent rapid wear is advisable.

The artificial teeth should be fitted to place, on a little wax, to be removed with the teeth. The lingual or palatal bar is shown completed and in place. Next, complete the anchor loop by soldering on lingual and buccal portions, pieces of the same kind of wire, vertically. See Figure B.

These wires are then bent so as to go below the gingival margins on both lingual and buccal sides, and fit over the gums about as a lingual bar is properly fitted, and swing distally to enter the saddles and escape the artificial teeth and bar if used as directed.

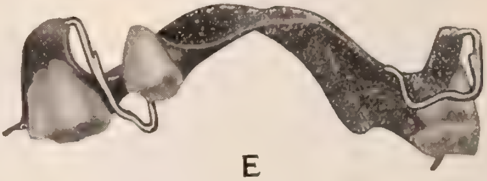
Loop or wire should not impinge upon the gingival margin or gum.

Loop A is fitted onto long, tapering teeth only long enough to engage securely. Short, square teeth require fitting more closely to gingivæ.

Free-hand soldering makes this work easier, not better, than investing and soldering.

To place the stress at or near the center of the long axis of tooth, solder a spur about the center of the occlusal of Loop A. This you may observe by looking at Figure B. C or D. The center spur shown in Figures B and C is one which places the stress where it belongs, and also is shown in the completed case, Figure D.

Part or all of the wax, or wax and teeth, are removed in order to allow the placing of the completed anchor loop in position. Contact of vertical loop and tooth should be at three points or areas only—.10 to .20 mm., between loop and tooth elsewhere. Teeth are then placed correctly and waxed up for vulcanizing saddles. I allow the lingual and sometimes the buccal wires to enter saddles, and bend out, so as to help hold the loops in position when packing, vulcanizing, etc. These are dressed off in finishing. See dot on vulcanite in rear of loop, Figure D.



E

Contact of anchor tooth and adjoining artificial tooth is best a line or narrow area near marginal ridge, providing ample inter-dental space.

The loops may be soldered to bar. It usually is easier and better not to do so, except in removable bridge cases, when soldering should be done.

Figure D shows the completed lower case in position. It does not show the spur on left side of cut, nor the lingual bar after being placed on model.

The last illustration, Figure E, is an upper case with vertical loops, not requiring spurs, and with finger rests distally on adjoining teeth.

Anatomical articulation, *plaster impressions*, Spence or other *hard models*, are demanded for this work. Do not attempt the work unless you are able and willing to produce models that would "look good" to a first-class orthodontist. These specialists know how to take impressions and make models, and also how to do free-hand soldering. Other dentists should profit by their example in this line, and do it for this work. *Take accurate bites.*

Place completed cases in position in the mouth by easing off carefully where necessary, same as when inserting partial plates.

Anchor loop work is conservative dentistry. It is the sort of work that will be done by the best men in the profession when understood and tested out. It will succeed where heroic mutilation fails. By its correct use, dentistry may be brought nearer by a step to the healing art. It is in no way "lightening dentistry," as it requires time and skill, and should bring results accordingly. It will however lighten the burdens of our clientele by conserving their time, health and dental organs. It is not necessary to grind our patients to pieces, while they "squigicum squee." It IS necessary to take impressions and bites that are RIGHT, and from these, exercise skill and art to the limit, while patient is at ease.

I have calculated and diagramed scientifically, and also have demonstrated practically, just how the appliance engages and releases in use.

In case of rear settling, how the anchor teeth retain their normal position, without destruction of tissue in vicinity of anchor teeth, also is shown in the drawings, but will not be incorporated in this report. I simply will state that the contact points of vertical loop are three: the end of central spur, placing stress on central area of long axis of anchor tooth, while contact on buccal and lingual is secured in a small area or point at cervical ends of loop A. The correct contacts are secured easily by bending spur so as to raise the loop .10 to .20 mm. Contact of gingival ends of loop A is secured by bending enough toward the larger or central diameter of anchor tooth to make lack of contact elsewhere about .10 to .20 mm. This provides for settling by releasing contact except at end of spur and the line or area of contact near marginal ridge, which is the contact of anchor tooth and adjoining artificial tooth.

In case of force exerted to dislodge the appliance, the contact points or areas all operate to retain it as securely as is desirable. The loops are adjustable in case of wear, or of the necessity to hold more securely to place.

Special pliers are used to facilitate bending the wire and in making the fine adjustments. And all necessary adjustments *must* be skillfully made.

Accept this as a dream from me, and, on my recommendation, work it out to a reality as I have been pleased to do, for the benefit of humanity and the dental profession.

Second Nat'l Bank Bld'g.

A man should learn to detect and watch that gleam of light which flashes across the mind from within, more than the luster of the firmament of bards and sages. Yet he dismisses without notice his thought, because it is his. In every work of genius we recognize our own rejected thoughts; they come back to us with a certain alienated majesty.—*R. W. Emerson.*

THE INDIRECT OR MODEL METHOD FOR INLAYS AND CROWNS*

EY EDWARD B. SPALDING, D. D. S., DETROIT

THE TERM "INDIRECT METHOD" probably prejudices many dentists from attempting to learn the impression and model method. It suggests something lacking in accuracy, or else it seems too complicated or too time-consuming to deserve attention.

Instead of lacking accuracy, we feel it makes for better work, and when the making of correct models is learned, more and better inlay work will be done than by the direct method. This has been proven to the satisfaction of many successful men.

Dr. F. T. Van Woert prophesied some three years ago that "unless some reliable and practicable method for the production of cemented fillings is secured it will suffer the fate of many other valuable discoveries and become a thing of the past." We believe the indirect method will be the saving of the inlay method to many of the profession at least.

It is not that the inlay lacks merit but the technic of producing accurate work when done on the tooth itself in the mouth is too exacting for the skill and patience of the average dentist. If, however, one attempts the impression method without first becoming acquainted with the principles of it, he is very likely to meet with failure and condemn the whole process. The principles are not obscure nor difficult to learn, but are more easily shown in clinic than described.

Those who have adopted the impression and model method are unanimous in claiming that it has been the means of improving their cavity preparation to a very great degree. It is difficult to be sure of cavity proportion, the lines in transparent enamel and the angles obscured in the shadows of a cavity in a natural tooth in position in the mouth, even when we have a definite form in mind. A correct model of a cavity shows us faults which we did not believe existed. In that way one soon learns to check up on his weak points and to study for better mechanical retention.

There are many advantages in the indirect method to both the operator and the patient.

The advantages to the operator are:

First: Shortening of operating time on the patient. We all know that the longer the operation on a single patient the greater the strain to both patient and operator. Two patients for an hour each are not as fatiguing as one patient for two hours provided that the work is equally exacting.

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*Read before the Michigan State Dental Society, April 13, 1916.

Second: Comparative ease in obtaining a good impression of the cavity as against the more difficult fitting and carving of wax patterns or the burnishing of a matrix in the mouth.

Third: Better opportunity for occlusal and other anatomical restorations. It stands to reason that more exact and careful carvings can be done on a model which can be readily handled and observed than can be done on a tooth in the mouth.

Carving to restore sulci, marginal ridges, cusps and buccal and lingual contour are being deemed more and more important in tooth restoration, no matter what the material used. These anatomical restorations when done in the mouth require expert technic, and that is acquired by but few.

The articulated model in the laboratory makes this carving possible and comparatively easy to the average dentist or laboratory assistant.

Fourth: Not only the possibilities but the opportunity after the impression is taken to delegate the whole process of making the model and then the inlay or crown to a competent laboratory assistant, thereby relieving the operator of much laborious work which lessens to an extent the cunning of his fingers for operating. I am free to admit that a clever laboratory assistant who is devoting her time to the burnishing of matrices and baking of porcelain inlays and crowns, and the carving of wax forms for cast work, can outstrip me in the same work when I have divided my time between that work and operating at the chair.

Fifth: When an office is equipped for the indirect method more and better work can be done each day than by the direct method.

Sixth: Ease in finishing and polishing gold inlays when done on a model.

Seventh: Much better margins and fit for porcelain inlays and porcelain jacket crowns.

Eighth: The opportunity to make corrections in a piece of work on the model, and if the piece is a failure, as sometimes happens, the model is a willing patient to submit to reconstruction.

Ninth: Operations which are difficult or even impossible by the direct method are comparatively simple by the impression and model method.

To the patient the advantages are chiefly two, viz:

First: The lessened time for operating directly in his mouth. There is no patient who chooses to have more work done in his mouth than is necessary.

The indirect method does lessen the time for the patient. After having work done by the indirect method a patient is very loath to submit to the direct method.

Second: It also eliminates much disagreeable work. It is much more agreeable for the patient to have an impression of an extensive cavity running beneath the gum margin taken with a properly fitted matrix and modeling compound, than to have a wax pattern trimmed and finished along this hidden cavity margin.

Also the finishing of a gold inlay on the tooth in the mouth is a most disagreeable procedure for a patient, and when he finds there is a way to avoid it he is going to do so.

Today the public is aroused as never before to the necessity of caring for the teeth; consequently the demand for the services of the dentist is greater and there is being done more of all kinds of dentistry.

Discriminating people are on the alert to find better, more skillful, more "humanitarian" dentistry as they submit themselves for operations which a few years ago were considered unnecessary.

The operator who studies to improve his technic for the consideration of his patients soon finds his time filled to overflowing.

The indirect method is a great aid to humanitarian as well as skillful dentistry.

THE PRO AND CON OF ROOT CANAL TREATMENT

BY CHAS. A. BURBRIDGE, D.D.S., GRAND RAPIDS, MICH.

EX-PRESIDENT MICHIGAN STATE DENTAL SOCIETY

WHAT ARE WE GOING TO DO with our root canals? This is the question which today presents itself to every progressive, earnest member of our great profession. This is the question that is commanding the attention, and serious attention, too, of every one of us who has the future of his patient, the future of his personal standing in the profession, and dentistry itself, at heart. And we pause in our mad rush toward mechanically perfect reproduction of nature's implements of mastication and ask ourselves, "Are we on a solid foundation?" "Are our abutments seated on bed rock or are we building on the sand?"

The investigation of Billings, Rosenow, and others, relative to the mouth being a prolific focus of infection accompanied by grave secondary manifestations, has been the cue for a more or less nation-wide scientific investigation by our leading Dental Pathologists, with most interesting and educational results.

The purpose of this paper is to very briefly, but very emphatically, bring to your attention some of the salient points of this much-mooted question, by presenting a few of the deductions and opinions of such men as Grieves, Rhein, Callahan, Best, Hartzell, Ottolengui and others, and allowing you to pass sentence upon the question, "Are we doing as individuals, and as a profession, all that within our power lies, for the healthful preservation of the pulpless tooth?"

Dr. Hartzell, in a paper read before the Minnesota State Dental Association, June, 1915, says: "The pulpless tooth of the future must be handled by vastly different methods than the methods of the past to escape condem-

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Read before the Michigan State Dental Society at Detroit, April 13, 1916.

nation." And you say, "How shall this be done?" The technic of root canal preparation has been gone into by few men scientifically, and they give us accurately and minutely the result of their application of this technic.

Dr. Best, in February, 1916, number of *Dental Review*, page 154, gives a very concise review of his technic, and so definitely and plainly stated as not to be mistaken by any one. Time and absolute asepsis in the entire operation are basic and salient points of his technic. He advocates the use of the X-Ray at least three times during a root canal operation.

Dr. Buckley, says in *Dental Review*, January, 1916, page 88: "I will not take a second seat to any one in the recognition I give and the value that I know is attached to the radiogram. Nevertheless I want to say with all emphasis at my command, that I do not believe it necessary to check up on myself every fifteen minutes with an X-Ray. If I will put my energy and my brains into opening up of these fine tortuous canals, I know that I go dangerously near to the root end by my technic. The reason we have gotten a black eye about it, and justly so, by the medical profession, is because we are not using the technic of Callahan and Rhein."

Dr. Grieves says, in an article appearing in *Dental Cosmos*, 1915: "I believe in, use and value radiographs, but they are far from the whole story." But the technic, as laid down by Callahan, Rhein, and Best, of the root preparation is unimpeachable. We must get to the end of the root.

But how are we to do this? All men who have studied out and are practicing scientific pulp surgery agree that operations upon root canals, being purely surgical, should be treated as such and the establishment of absolute asepsis should be obtained. Callahan says, the maintenance of aseptic conditions is of first importance. Dr. Best, says: "The thing that troubles us is that we have been unable to see the similarity between the opening into a vital pulp and the condition with which a surgeon deals when he creates a wound in his patient." Rhein, Grieves, Buckley, Ottolengui and others all stand for the importance of surgical asepsis to the ultimate satisfactory results in root treatment.

The technic required for perfect opening of canals is somewhat variable, being largely a question of the procedure which gets the desired results at the hands of the individual operator. Callahan, through twenty years of actual practical experience, still advocates the use of sulphuric acid solution and bicarbonate of soda solution. He says: "The sulphuric acid solution is used for the purpose of softening the surface of the pulp canal walls to permit the passage of barbed or roughened broaches to and fro through the canal, enlarging the canal by breaking loose the softened dentin. Soda bicarbonate solution is injected that the broken down dentin and other disorganized substances may be removed from the canal by effervescence caused by the escape of carbonic acid gas—the resultant of reaction of soda upon sulphuric acid. This reaction leaves the canal in a state of surgical cleanliness, which, to my knowledge, cannot be said of any other method or agent." Buckley advocates the use of phenol-sulphonic acid neutralized with soda bicarbonate solution because he says: "Sulphuric acid if used too strong will char the tissue and carbonize the walls of the canals. With phenol-sulphonic acid you cannot carbonize, you cannot char anything that is in the canal."

Dr. Rhein advocates the use of sodium and potassium, as does also Dr. Ottolengui. Grieves says: "The pumping of sodium and potassium in the canal with its most efficient power of destroying soft tissue is apt to produce tissue necrosis in the apical area, often without infection but with liquefaction of bone and the apical fibers, denudation of cementum, and necrosis of the apex." Rhein says: "It is essential that an area of healthy tissue be removed at the same time in order to be sure that no diseased tissue is left behind. This is precisely what sodium and potassium and ionic medication do when properly used."

Best, advocates the use of sodium and potassium for he says: "If you cannot get to the end of a canal use sodium and potassium and then introduce sulphuric acid which will neutralize the same, thus preventing any liquefying action which might result from its use." The instrumentation adapted to root canal surgery is again the choice of the individual. The file as advocated by Dr. Best, would be perhaps wholly useless in the hands of many operators. The fine barbed broach passed along the side of the largest branch of the pulp is advocated by Dr. Callahan followed by the fine Kerr drills manipulated by hand. The basic and all-important point in the technic and the one agreed upon by all scientific pulp surgeons, is accessibility to canal entrances, even at the expense of healthy tooth structure. Root canals must have definite and distinct opening and direct entrance so as to enchance the further and complete opening of the canal itself. The filling of this aseptically opened canal is doubtless the most discussed feature of the entire operation of root treatment. What shall be used as a material for proper root sealing? Shall this filling pass just to, not quite to, or beyond the apical opening? These are questions which are facing each of us and which are promoting most heated debate between Dental pathologists.

Dr. Best, in a discussion of Dr. Hartzell's paper read before the Minnesota State Dental Society in June, 1915, says: "The failure to get a pulp canal filling to the apical region is not a crime, although many think it is so. The end of the root may be closed off by cystoids, and any infection that may be inside of that root may not go into the peri-apical space."

Dr. Grieves gives a somewhat extended discourse on the procedure at the root end, in a paper read before the State Dental Society of New York at Rochester, May, 1915, under the subject of "The problem of complete pulp extirpation," he goes on to say: "That every particle of pulp which it is possible to remove by the finest instrumentation and technic and with no regard for time consumed, should be removed, goes without saying; we are also convinced that the operation should be painful if the apex be vital, and the filling should end *to* and *in*, but *never through* the apex, with certain exceptions to be noted later."

The rather recent, and what might be termed too officious, surgical procedure in this area is to be deplored—we refer to the practice of intentional perforation, under broach manipulation with sodium and potassium—for the reason that it is not possible, even with help of a radiograph, in the majority of adults, to look into a canal and to follow all its ramifications to the ultimate, and then on out intelligently into the pericementum, though it is easily done in the open canals of childhood and adolescence. Some sort of perforation can always surely be made, a gold wire passed, and radiographs taken—but is this the real vessel opening? Have we not added another chance for damage and infection of the surrounding tissues, and after all left the old one still containing a part of the pulp? And if we succeed in filling this new one, how are we going to fill the original opening we cannot find?

If there are other vessel openings at angles to the main canal, how are we going to excavate and fill any of these, when we cannot determine their presence by radiograph or sense of touch? Again what is the idea in perforation, anyway? Presumably that every particle of pulp tissue be removed. But when it comes to a question of deliberate puncture that all vital pulp be removed, it were better to consume the time in conservation, and to stop just short of it—to remove the pulp to, but not through the apex.

Perforation of this region with a projecting filling is only permissible, we believe, in chronic alveolar abscess, to be followed by immediate treatment, or in cases where an immediate apicœctomy is planned. It is simply inconceivable as routine practice and will reflect on our methods in the minds of all pathologists. A projecting filling invades a joint accommodating the sway of the tooth, and this dependent upon the destruction of peridental fibres. This sway is present in normal teeth and more defined when periapical foundation has been destroyed. Extensions of gutta-percha beyond apical end all move as the tooth moves which fact prevents encapsulation. It has been said that bone would build about such sterile gutta-percha fillings, which fact together with assurance of well filled roots, is given for such procedure. There is radiographic proof that such is the case if foreign body be at rest but *never* when the body is moving as in a tooth.

Dr. M. L. Rhein, on a criticism of Dr. Grieves' paper, read before New York State Dental Society, May, 1915, says: "In reference to the protrusion of the root-filling through the foramina, it may be of interest to the essayist to learn that there is no intention to have the filling material do more than encapsulate the end of the root with gutta-percha. Gutta-percha is one of the most compatible materials that can be placed along side the soft tissues, and it is well known that if it is used in this way with every regard to thorough asepsis, there is practically no reaction from the tissues. The therapeutic principle that is desired, and that is imperatively necessary, is that no place of possible habitation of wandering micro-organisms should be left in the periapical area when the operation is concluded. This object can never be attained unless periapical end of the foramen is sealed."

It is not the intent of the operator to force the gutta-percha through to any great distance, but in the act of attempting encapsulation, it very frequently occurs that the gutta-percha is forced there to an appreciable extent. This will produce some trauma, the same as follows ordinary surgical operations, but it soon passes away. It does not do what the essayist claims it does, viz., interfere with regeneration of bone tissue. On the contrary, the limited motion which takes place in this joint in no way imperils the condition of the gutta-percha or the normality of the structure in which it is placed.

Dr. Shields, in a discussion appearing in *Cosmos*, 1915, observes that a root is infinitely better sealed just to the end with gold, leaving the anatomical space at the apex of the root the same as before the pulp was devitalized—than to penetrate that root at its most critical point and allow the slightest extension of gutta-percha into the apical space.

Dr. Ottolengui asks the question: "Shall we carry our canal filling to or through the apical foramen?" And then goes on to say: "I think it makes a difference what the conditions are. For instance, if we remove an uninfected·living pulp, there is no reason to believe that the pericementum is other than vital and healthy, consequently I see no reason why we should protrude broaches, wires, or gutta-percha or anything else through the apex of the tooth. Every precaution should be used to fill such a tooth to the foramen and no further.?"

But in the presence of infection the problem is quite different. Then is it that we must remember the possibility of the so-called multiple foramen, and the further possibility that the nutrient vessels which should occupy them have died. We need not worry about multiple foramina so long as the pericementum is living and healthy but should it be dead so that the foramen are uncovered, then of course their contents must be counted as infected or at least infectious tissue.

The sterilization of these foramina having been completely accomplished, the canal must be filled with chloro-percha sufficiently fluid to force into the extra foramina, through the major foramen, out of which it should exude so as to flow over and around any part of the apex which is denuded of pericementum, thus not only coating the root end with an aseptic, non-irritant shield but at the same time covering the outer openings of these extra foramina.

You are indeed all familiar with Dr. Callahan's method of filling properly prepared root canals. His resin (or rosin, as he calls it) and chloroform solution created much criticism for and against when he introduced the same to the profession. The principle of rosin filling is an old one, having been used some years ago but was abandoned due to its stickiness and difficulty in handling but Dr. Callahan's mixture of rosin and chloroform offers a means of satisfactory manipulation.

He says in discussion read even as long ago as July, 1911, before the National Dental Association: "A tooth treated in this manner (referring to technic for filling root canals with rosin, chloro-percha and gutta-percha cones) out of the mouth and made into a thinly ground slide will show that the tubuli are filled to the cementum with rosin. The canal is filled with a mixture of rosin and gutta-percha that is hard and insoluble in body fluids, does not shrink, and is compatible with surrounding tissue, as is chloro-percha."

In a paper read before the First District Society of New York in March, 1914, he says: "Rosin and chloro-percha and cone is superior to chloro-percha in three ways. First, the rosin in chloroform penetrates deeply in the tubuli and foramina that chloro-percha will not enter at all, leaving without such tubuli and foramina, upon the disappearance of the chloroform, a more or less solid, inert insoluble substance that enmeshes the contents and seals the lumina of such tubuli or foramina. Second, the rosin and chloroform causes the gutta-percha in whatever form it may be applied, to adhere closely to the walls of the root canal or cavity. Third, the incorporation of the rosin in the freshly made chloro-percha makes an unshrinkable and impervious mass about the gutta-percha cone.

Dr. Dunning, who is an advocate of Dr. Hermann Prinz's method of filling root canals with paraffin, in a discussion of Dr. Callahan's paper, observes: "Solidification through cooling, involves less loss in bulk than solidification through evaporation. When a mass of paraffin for instance, in a liquid state is chilled and becomes solid there is, to be sure, a definite amount of shrinkage, but that amount is almost negligible as compared to the shrinkage of chloro-percha from which the chloroform has evaporated. Furthermore, the paraffin in process of shrinking, clings to the periphery of the root canals, or the vessel containing it, and becomes depressed toward the center so that in spite of the shrinkage there is still an absolute fit of that mass of paraffin against the wall of the tooth. On the other hand as chlora-percha undergoes its shrinking process through evaporation, the mass of gutta-percha shrinks upon itself and leaves a crack at the periphery, varying of course with the bulk of the material.

The pro and con of root canal treatment, is a big subject, and in the ratio of one to one thousand is its bigness to its importance. We, as individual members of this great profession, can ill afford to rest inactive and unalert to it. Individual research in this great problem is our earnest duty. Familiarizing ourselves with the principles of technic as laid down by those who are earnestly devoting their lives to the accomplishment of an ideal in this work, and a closer application of these principles is our goal.

The foregoing review of current literature on this subject has for its aim the emphasizing of the gross importance of this part of our work so that "we may," to quote Dr. Best, "instead of making it one of the minor considerations, consider it equal in importance with any operation which we do in the human mouth."

RESTORATION OF A RESECTED JAW BY MECHANICAL MEANS*

BY E. M. COOK, D.D.S., TOLEDO, OHIO.

THE REASON I present this subject for your consideration is the almost hopeless condition that confronted me in undertaking to give the patient relief.

The history of the case begins with the unsuccessful attempt to remove an impacted left lower third molar; this was fifteen years ago; two years later a second attempt was made to extract the tooth, which was also unsuccessful.

During the following three years the patient suffered much pain and inconvenience, finally going to the hospital when it was found necrosis had made considerable progress in the destruction of the bone; the necrosed bone was removed with the remainder of the tooth, but the parts refused to heal.

Six months later she returned to the hospital when a more extensive operation was made, after which she seemed to recover, being comparatively comfortable for about a year and a half.

During the next three years she had much trouble, pus forming almost continuously; her health became greatly impaired and she had lost confidence in the ability of the surgeon to give her relief; however, the condition had become so serious, that she was again persuaded to consult a surgeon, who found a cyst had formed making it necessary to remove the lower maxillary bone, forming the distal of the second lower bicuspid, to the articulating surface and including the parotid gland.

When convalescent, she was brought to me with a request from the surgeon that I do something for her.

At this time the jaw had moved to the left fully an inch; the right lower central crossing the left upper cuspid and being the only point of occlusion.

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*Descriptive Clinic at Ohio State Dental Society, December, 1915.

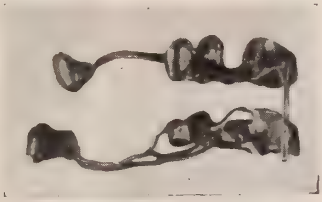
She was very much disfigured and wholly unable to masticate.

I consulted a number of works on oral surgery, also magazine files, but was not able to find reference to a case of this kind.

I concluded that I must make a fixture that would restore the chin to the median line and hold it there; at the same time it must be flexible, to allow the mouth to open and close with ease.

It must be strong, easy to keep clean, and unobtrusive.

It must also restore the normal occlusion of the teeth.

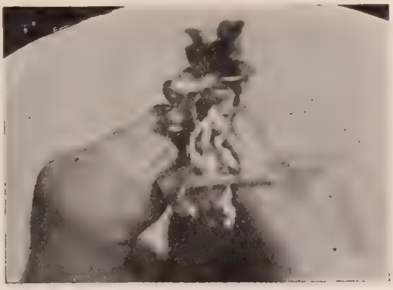


The first picture shows the condition when the case came to me.

First, I made models of the mouth mounted in occlusion on an articulator. I then opened and closed that articulator four million times, and I am not going to tell you how many more times than that.

It looks to be the simplest problem in the world but it was not. Not to me at that time.

I am writing this down so it may help some one in the future not to open and close that articulator four million times before he finds a means of accomplishing the desired result.

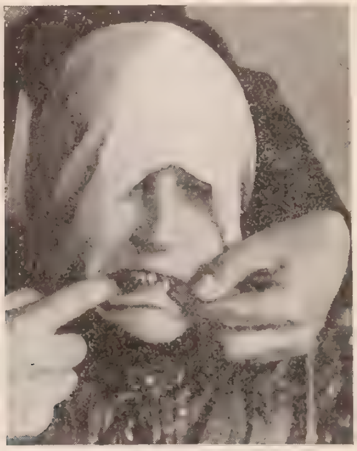


The first and third right lower molars had been removed. I made gold crowns for the right and left lower bicuspids and for the second molar, using a dummy first molar. I constructed a lingual bar of iridio-platinum, attaching it to the bicuspids on each side, uniting the crowns, forming a rigid piece.

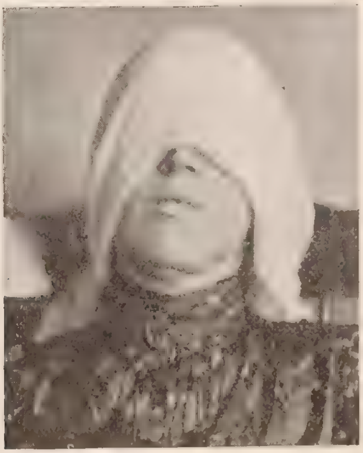
There was a full denture on the upper jaw; crowns were constructed for the corresponding upper teeth, and a crib bar of iridio-platinum wire extending across the roof of the mouth uniting the bicuspid crowns on either side; these bars being used to prevent the crowding over of the teeth.

I then attached a straight piece of fourteen gauge clasp gold wire, extending along the bucco-occlusal surfaces, from the second molar to the first bicuspid, forming a straight bearing surface or plane; filling in back of this wire, so there would be no pockets for the retention of food.

I then attached very securely a piece of ten gauge iridio-platinum wire, one and one-fourth inches long to the lower piece between the dummy and the second molar in a perpendicular position, making a finger that engaged the plane on the upper case, this finger permitting free use of the lower jaw, and working against the plane, as the patient opened and closed the mouth, and at the same time holding the jaw in normal position.



The second picture shows you the piece open, with the finger resting against the plane.



The third shows it in occlusion.

The fourth shows it in occlusion in the patient's mouth.

The fifth and last shows the chin held in position by the fixture, in its normal relation to the rest of the face.

I will say in closing, this appliance has been worn for six and one-half years with entire satisfaction; the patient being able to masticate without inconvenience anything she desires.

In the first six months after the appliance was placed in position she gained thirty-five pounds, bringing her to her normal weight.

Were you to meet her and talk with her you would not suspect she had lost nearly one-half the lower maxillary bone.

Nicholas Bld'g.

SILICATE CEMENTS

BY C. M. BALDWIN, D.D.S., TOLEDO, OHIO.

IT IS A SERIOUS HANDICAP to the progress of the profession that results of dental work are intangible, and controlling conditions variable or uncertain.

Completed operations that apparently are successful too often fail to fulfil expectations, or prove satisfactory for a sufficient time; consequently all such must be classed as partial or total failures when they do not meet the requirements of a fair time-test.

All conditions must be considered before deciding whether days, months or years—five, ten or more—of service should be considered as successful or as giving full value in return for all expenditures of time, energy and money. Making due allowance for all other considerations, operations and materials are valuable in proportion as the percentage of successful results following their use is highest for the longest time. While saving teeth is the fundamental principle of modern dentistry, comparative values of teeth and all the requirements necessary to produce satisfactory results should be carefully considered before deciding to perform a given operation. Patients properly may expect that the value received shall be a fair equivalent for their entire loss of physical and nervous energy, together with the inconvenience, time and fees involved. Dentists have worked hard and subjected their patients to long tedious operations while inserting gold fillings which, to be satisfactory, necessarily should have been serviceable for many years. During that period the professional position of dentists very largely depended upon their ability to successfully manipulate gold foil, just as in earlier years it was based upon their skill in extracting teeth and making plates.

The permanency of gold fillings and the naturalness or esthetic effect of silicate cement fillings are the principal reasons for their use; but, esthetically considered, gold fillings are very disappointing, while silicate fillings increasingly are demonstrating their durability. Permanency of gold fillings depends upon judgment and skillful manipulation of the operator, and exactly the same conditions influence the durability of silicate cement fillings.

The unknown standard of permanency of silicate cement fillings very unfortunately has allowed many conscientious operators to remain self-satisfied, although results were disappointing, while an accurate knowledge of the possibilities of the material would have stimulated them to make a more thorough study of material conditions and how to use it more skillfully.

As operations increase in difficulty and danger, and demand greater skill, operators are honored who most successfully perform them and fees obtained usually are in direct ratio. Probably no other dental operation has caused such diverse opinions relative to values of materials or fillings, or generally puzzled dentists as have silicate cements for the last ten years.

Many dentists fail today to realize how seriously their position depends upon their understanding and skill, or the lack of them, in manipulation of silicate cements.

A liberal profession condemns isolated ability for keeping valuable personal knowledge for private benefit from selfish motives.

It is necessary to have general and free interchange of thought to enable a profession to develop its highest possibilities.

The great value of gold foil was established because such men as Webb, Varney, Black, Johnson and Conzet for many years studied its nature and possibilities, and by long and patient application increased their knowledge, skill, technic and equipment, *each profiting by the experience of those who preceded him;* and all freely gave the benefit of their special knowledge to the profession.

Practically every operative field has been developed by men of unusual ability who freely and generously, through the medium of clinics, papers and discussions helped to build up knowledge along special lines. It is impossible to decide just how much benefit and momentum a profession derives from such influences, but cooperation has enriched and rapidly developed modern dentistry.

Unfortunately this has not been true in silicate work. Instead the extreme opposite condition has prevailed and continues with few exceptions. All required information about ingredients and chemical qualities of materials should be furnished by manufacturers and their representatives, but the profession using such articles should give wide publicity to the best methods for securing the greatest benefit from their use, which can be learned only by clinical observation and practice, as soon as the merits of their methods are safely established.

Silicate cements have been used in this country for twelve years and very extensively for the last five years. How many expert users can you name—or do you think there are none?

How many have written constructive, helpful articles, given clinics or publicly identified themselves with this class of work, so as to benefit others or received help from other skillful users? Blot out all the available information about silicates, except that about qualities which has been furnished by the manufacturers, and how much of any value is left? Compare these conditions during this period with a similar time in the history of inlays and crowns and form your conclusions.

Although silicate work has been seriously handicapped by this unusual lack of constructive interchange of clinical experiences and observations and by many other unfavorable influences that could be mentioned, this new class of materials possesses such valuable qualities that it not only has been found to have a legitimate place in the best of modern practice, but to an astonishing extent has reduced the use of porcelain inlays and gold fillings. Comparatively few dentists use porcelain inlays and of these very few claim to use them as extensively as they did five or ten years ago. Fifteen years ago had anyone claimed that a cement or plastic material largely would displace gold fillings in general practice, he would have been considered either insane or a dreamer.

It is surprising to learn how generally and extensively silicate fillings have taken the place of gold fillings especially during the last five years.

It is nothing unusual to hear expert gold operators and many others state: "I have inserted very few gold fillings the last three years" and such statements have been made by operative professors. After ten to twelve years extensive use of the same silicate cement others have claimed that they and their patients were better satisfied with results than at any previous period of their practice.

Generally, dental colleges are giving more attention to and instruction in silicate work, and increasingly State boards are including it among the required subjects for examination. Gold manufacturers and dealers state that much less filling gold is being used.

This remarkable change has taken place under *unfavorable conditions* in about ten years.

Under much more favorable conditions following the general acceptance of silicate fillings as having proved valuable, destructive influences should give way to constructive efforts and intelligent criticism or analysis of facts, conditions and all elements that can influence results.

Materials, methods and equipment have been greatly improved, satisfactory results have developed confidence, and experience has shown that this apparently very simple type of work requires the best of professional knowledge, ability, and careful attention to all details in order to have the highest proportion of successful results for the longest time. The contempt for or abuse of plastics has become proverbial in dentistry, but with no other plastic has there been so much abuse as with silicate cements.

It is a serious mistake to think or lead others to consider this work as very easy, as requiring no particular care or attention. It is equally erroneous to make the work appear difficult or complicated.

The real need is that we shall *acquire the information* that gradually has been developed by the most successful operators and *adapt ourselves to the new conditions*. The more thoroughly these facts are understood, assimilated and put into practice the simpler and more attractive the work becomes, Certainly no other method comparable in value demands so little hard work or energy from patient and operator.

Materials and operative conditions must be known thoroughly before it will be possible to use them as successfully as we should. Dental college training is the foundation upon which we build professional knowledge. We should increase our skill and learn how to make better fillings, inlays and crowns when we take post-graduate courses, attend dental societies, read dental journals and intelligently use the new information gathered from such sources.

Silicate cement study clubs consisting of but few members would be helpful. Investigation away from the mouth should be carried on particularly with reference to working conditions and behavior of materials during the operation. When two or more silicate cements are being considered the difference in their qualities should be understood, at least to the extent of requirements for preserving their best working conditions and such variation in technic as is necessary to produce best results.

It should be understood that none but the specialized chemist is prepared in any adequate way to study and really appreciate the value of the chemical ingredients, formula and reactions that take place, but many would be benefited by careful reading and giving more attention to the chemical features as explained in various papers that have been or will be published.

The immense amount of work involved in attempting by laboratory processes to investigate cements, even of the regulation crystallizing oxyphosphate class, is clearly shown in the report of the Research Committee on Cements published in *The Journal of the National Dental Association*, November, 1915.

Compared with other filling materials silicate cements have shown a much greater tendency to deteriorate both before and after bottles have been opened. Some silicate cements are much more sensitive and change much more easily than others, which means that fillings will be less durable in proportion to the loss in quality of materials, as users can not restore the original chemical value as they renew the qualities of gold foil by annealing. Fillings can be no more valuable than the *condition* of the powder and liquid *when used*.

The information necessary for successful work has been gathered and printed so that everyone may have the benefit of it. No longer must users originate methods or use technic contrary to instructions in order to succeed.

Details may vary more or less with different successful users at this time, but comparison of views and the test of time will decide between their values. The essential feature is that by using methods *known* to be correct and satisfactory dentists should strive to develop all of the best possibilities of the material. This will require the cooperation of the most successful users to more thoroughly develop knowledge, skill, technic and establish the *highest standards* of fillings by which all results may be compared.

In silicate work, isolation and silence have covered a multitude of mistakes, while by meeting other users, comparing views, giving chair and table clinics, together with proper explanations, correction of such errors can be made. Even though statements were made or technic used that might be faulty, it would not be very long before some one would be able to correct them or show a better technic if publicity were given to such operations as is ordinarily the case. Certain facts exist but all statements about them may not be correct; that will depend upon intelligence and truthfulness. Predjudice inflicts its own punishment. Professional men cannot afford to lose the advantages of mutual helpfulness, but should be willing and anxious to examine the facts and all evidence properly submitted. The effect of such consideration will vary with each individual's experience and capacity. Unfortunately the judgment of many has been swayed back and forth by the crudest kind of commercial statements, and too little attention has been given to strictly professional considerations while the importance of the subject is increasing. During earlier years empirical practice prevailed generally, but gradually and increasingly a more professional attitude is noticeable. As a rule the more successful the operator the more respectfully they treat the material; and the reverse has been true, including the placing upon the materials most of the responsibility for all kinds of failures.

"And a proverb haunts my mind
As a spell is cast
The mill can never grind
With the water that is past."

While this is true it would be a tremendous loss if we failed to profit by experience. The immediate future ought to contribute a large amount of valuable information that should be gathered from clinical data and chair experiences, which, when accurately recorded and carefully analyzed, would be very beneficial.

Establishing correct standards of value of each quality of a material would prove valuable and is very much needed. Every property of the material and fillings made of it, all details of technic, and everything that properly should be included in equipment ought to be examined, criticised, and endorsed or condemned; all of which would enable users to judiciously choose between the many factors that can influence results.

Keeping accurate records, including important details, will be necessary to provide reliable information upon which to form intelligent opinions. In addition the user cannot fail to form impressions as the result of each day's work and observations, which, with the records, will form the correct basis for analyzing results.

Accurate diagnosis or analysis depends upon the opportunity to develop ability to observe conditions, recognize facts as they exist and form correct conclusions, all of which becomes increasingly difficult with the degree of accuracy and completeness of detail shown in the analysis.

Two or more dentists have examined the same fillings and have disagreed in their analysis of conditions and cause of defects. Such disagreement necessarily would affect their selection of what was necessary to correct the failures, not only of that case but of others. While the facts in a given case are the same, one observer might find all of them and another individual easily could overlook one of more and necessarily conclusions formed as to cause of failure would not agree. Defective margins have been attributed by some to shrinkage or poor edge strength of the materials, while other operators have realized that they were caused by faulty technic, lack of skill or equipment, or possibly all three.

There would be no doubt as to whether the operator or material was the cause of poor margins if the standard of value of the material as to margins had been established in the minds of all by their seeing many perfect margins where the *same kind of material had been used*, or reliable information had assured them that other users commonly secured satisfactory margins.

A very small number of successful fillings could establish the fact that a certain material possesses good qualities while a large proportion of unsatisfactory fillings would not alter the fact, but would indicate either deterioration of materials or a difference in operative procedure as the most probable causes. The experience with silicate cements has thoroughly demonstrated this feature instead of differences in chemical qualities of saliva being responsible for the irregularity in results.

Dr. C. C. Voelker's paper published in The Dental Summary in September, October and November, 1914, and the later one read by him at the Ohio State Society, December, 1915, show some of the values and possible results from keeping accurate records; and also indicate that valuable information is coming from the daily user at the chair.

Today's knowledge and skill control today's work, but what about next year and afterward, when today's fillings reappear in satisfactory condition or as failures; what will you have gained by the intervening experience and an examination of your records? Many records would not show which silicate cement or what method of insertion had been used and details probably would not be mentioned, or would be rendered less valuable, by the omission of many essentials. Comprehensive detailed records increase in value as fillings age. Every result is produced by one or more causes, and the principle by which this is brought about should be understood, because, to a large extent, they are influenced by the operator. Silicate work would be very much simpler if a certain defect always was the result of but one and the same cause; as though for instance, a defective margin were caused by over heating the filling while polishing, and nothing else could cause such a failure; but generally this is not the case. Such a total results as shades, margins of fillings, translucency, etc., whether successful or failures, are produced by many causes, or groups of causes, besides those directly due to nature of materials.

The mix while of great importance has had more responsibility thrust upon it than justly can be placed there. A thoroughly correct mix will not prevent *all* kinds of failures. The mix has a great deal to do with either aiding or preventing success of almost every quality by which a filling can be judged.

Eliminating materials and equipment from the problem, margins of fillings are the results of cutting cavities to certain forms, materials as mixed and packed, the setting and polishing process, together with protection from moisture during and after insertion. Each of these divisions is the result of a group of causes, which in turn may be subdivided and each in turn becomes the effect of a previous cause, and this analysis could be carried on almost without limit. It is fortunate that individual initiative need not be depended upon to investigate back to original causes, but someone has had to follow such chains of cause and effect to furnish materials and information that are available.

In so far as each individual understands and applys the principle connecting each cause and effect will he build up a secure knowledge based upon fundamental facts.

The subtle character of silicate work offers a great opportunity for displaying one's personality. Always this factor will cause more or less difference in results that it would be difficult to define more clearly, or that none but the operator would have a chance to analyze.

No one man ever has been or ever will be able to supply all of the information on this subject, but if many will furnish something of real value the total will be a tremendous gain, and when another five years shall have passed, practice with silicate cements by that time would be upon a decidedly higher professional level. Distinctly improved standards and results would stimulate all to more thorough and skillful efforts.

THE RELATION OF ORAL INFECTION TO GENERAL DISEASE*

BY CHARLES M. MIX, A.B., M.D., F.A.C.S., MUNCIE, IND.

THE RAPID STRIDES made in medicine and surgery since Pasteur and his followers pointed out the relation between bacteria and disease have made it difficult for any individual to keep pace with the growth in all its ramifications.

Our original conception of infectious diseases was that they were local and spread by contiguity of mucous and cutaneous surfaces to the interior. The modus operandi of diphtheria was one of the first diseases studied. Diphtheria is a strictly local disease. The bacteria remain at the site of inoculation and do not themselves enter the blood stream. Their toxins, however, are rapidly absorbed and produce the disastrous results once so common, but now, thanks to the antitoxins, seldom encountered. The discovery of the diphtheria antitoxin gave an impetus to the serum idea and serum for nearly all infectious diseases was made and tried, only one of which has stood the test of time, namely, tetanus antitoxin. It was not until 1899 that Klebs discovered that certain diseases heretofore considered local in their manifestations were really septicæmias. Since that time the specific organisms of many diseases have been recovered from the blood-stream and from the tissues remote from the focus of infection. Thus typhoid fever ceased to be an intestinal disease and took its place as a general infection. The point of entry is in the lymphoid tissues of the intestinal tract, from which the germs are absorbed into the blood, where they may be recovered. Their elimination by the kidneys was also noted. The same thing proved true in pneumonia. Tuberculosis came up for a critical review and the previously observed clinical facts were correlated with the findings of tubercle bacilli, in many cases free in the blood ready to localize at the points of least resistance. Probably we are all more or less tubercular. The delicate cutaneous reaction of Von Periquet spares very few.

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*Read before the Northern Indiana Dental Society, 1915.

The same proved true in regard to pus organisms, staphylococci and streptococci. The factor of resistance of the host came in. It was found that a general infection might be so overwhelming as to kill promptly, as in pneumonia, streptococci septicæmia (puerperal sepsis or so-called "blood poison"), acute milliary tuberculosis, or malignant endocarditis, etc., or the organism lingering on the threshold, so to speak, lost some of its virulence, the host gained a partial immunity and we had what Adami so aptly called "sub-infection." It is this group of sub-infections that is responsible for chronic diseases. There ensued a frantic search for local foci of infection. Naturally the digestive tract was most obviously an easy portal of entry. We now speak of water-and-milk-borne diseases, such as typhoid and dysenteries. But it was soon found that the number of diseases gaining entrance through the food was comparatively small and that the gastric juice of the stomach made an effective barrier to most pathogenic bacteria ingested with the food.

The unbroken skin and mucous membranes act effectively in excluding the host of pyogenic and other bacteria. But a scratch or cut, however slight, may give the bacteria their chance. I remember, when a medical student, having a friend give my back a vigorous rubbing for slight myalgia. In a few days I had a fine crop of boils at the sight of his vigorous rubbing. He literally rubbed staphylococci, which he had obtained from attending to his own person, into my unsuspecting back.

When the tonsil was recognized as a focus of infection we thought we had the answer, and a crusade was inaugurated against the offending tonsil. It was soon found that the tonsil did not tell the whole story and other foci were hunted for. The lesson from the tonsil was a valuable one, for it was found the chronic tonsil, with its sealed crypts and closed foci of infection, retrotonsilar abscess, blind abscess if you will, were the real offenders; the acute tonsil, acute fallicular tonsilitis, produced a grave but transient disturbance; that large quantities of toxins but few living bacteria were absorbed.

Next the alveolar process and the gums came in for investigation, and here it was found that in like manner the mouth infection, with drainage, produced their effect by absorption of toxins and swallowing of pus, while the hidden foci or blind abscess produced the sub-infections.

In pyorrhea as in amœbic dysentery, the amœba breaks in and the bacteria do the work.

The infecting organism in the blind abscess, is of course, one of the cocci, and of these the streptococcus plays by far the most deadly role.

We have long looked with suspicion on the patient that has frequent attacks of grippe. The symptoms of grippe, malaise, chilliness, slight fever, general aching, simply mean a low grade of infection, and if these attacks repeat, one should look for chronic foci of suppuration. Only recently has the full significance of the mouth as a source of infection been appreciated either by physicians or oral specialists.

The work of Billings, Rosenow and others has given a tremendous impetus to the recognition of the mouth as a source of focal infection. They have worked out the relation of these latent foci of suppuration to a number of chronic diseases and obscure conditions that have in the past been vaguely classified as auto-intoxication.

We may pass over the bacteria that gain entrance through the intestinal tract from the swallowed food. That an enormous amount of pus is swallowed in the course of a case of pyorrhea is easily seen. It takes from twenty to forty years to completely destroy a good set of teeth. Bass computes that during this time the patient swallows about two gallons of pus.

Bacteria of the streptococcic group are responsible for nearly all the infections that produce septic diseases in the mouth; hence, for the purpose of this paper, we may confine ourselves to this group alone.

Where do these pesky germs get a foot-hold? In the gums, the teeth, the alveolar process, pyorrhea, abscessed roots, infected cavities, crowns, bridges and fillings that are left rough and impinge on the gum margins, set up irritations that lead to foci of infections, gingivitis, etc.

The great conservative work carried out with such marvelous skill and for which the world owes a debt of gratitude to American dentistry is not without its dangers. It may be good dentistry to preserve teeth that are devitalized and may serve a useful purpose in mastication, but if in so doing a focus of infection is established in the mouth it is not good dental medicine. The dentist who is to serve the best interests of his patient must get away from the idea that dentistry is a problem in refined mechanics, and grasp the importance of oral bacteriology and health conservation.

Rosenow has pointed out that members of the streptococcic group gain entrance to the system and there remain, producing important tissue changes. The members of this group are many and new varieties are being constantly added. The chief varieties so far recognized are the streptococcus pyogenes, s. hemoliticus, s. viridans, and pneumococcus. There are different varieties of streptococci under varying environmental conditions such as parasitism, different degrees of oxygen tension, and, experimentally, by passage through guinea pigs, change from one form to the other increasing or decreasing in virulence and in their selective action on the various tissues and organs of the body.

This selectivity of the different types of streptococci is very interesting. One type, the pneumococcus, is responsible for pneumonia; another for malignant endocarditis; another for chronic ulcerative endocarditis, which, by a shrinking effect on the heart valves, produces all the types of organic heart disease except those due to syphilis. Acute articular rheumatism is produced by another type, still others produce chronic rheumatism and arthritis deformans. Rosenow has isolated a streptococcus from a gastric ulcer, excised at operation. Guinea pigs inoculated with this germ developed typical gastric ulcer.

Light was thrown on the etiology of rheumatism, organic heart disease, nephritis, chronic rheumatism, arthritis deformans, and the abdominal infections, appendicitis, cholocystitis, gall stones, peptic ulcer and pancreatitis.

Rosenow has obtained a streptococcus from a focus in the alveolar process, tonsil, and from pyorrhea. The appendix having been removed on account of an attack of appendicitis a few days after the tonsilitis, has yielded the same germ, which when injected into animals has produced typical lesions in the appendix. From the appendix of the experimental animals the same organism has again been obtained, thus fulfilling the canons of Koch's law. The same is true of gall bladder, gastric ulcer, and pancreatitis; and has been worked out in rheumatism, arthritis and valvular heart disease.

In all these cases with proper technic it is possible to isolate the infecting organism from the blood stream or from the tissues involved. This is found identical with the organism from the original focus.

If we can succeed in finding and eradicating the original focus we have removed the exciting cause. An autogenous vaccine made from cultures of blood or other tissues gives us a means of raising immunity. Equally important are the general measures, tonics, iron, fresh air, proper food and rational living. These measures are just as efficacious in the sub-infections due to the pyogenic bacteria as they have proven in tuberculosis.

Lane has long contended that the terminal ileum in cases of chronic intestinal stasis was the focus of absorption of the toxin which resulted in the most profound auto-intoxication. His operation of short-circuiting the large bowel, or better his colectomies, by affording adequate drainage of the terminal ileum, led to the cure of a class of cases hitherto incurable. He reports cures of arthritis deformans and exophthalmic goitre by this operation.

Recently an American author has reported a fairly large series of cases of arthritis deformans cured by colectomy, from the terminal illia of which he has succeeded in isolating the streptococcus viridans. Thus it appears that the terminal ileum becomes a sub-focus and keeps up the trouble which may have started in the mouth or tonsil.

To sum up the results of many years of work on goitre it seems now fairly safe to say that goitre occurs as an adaptive reaction on the process of immunization to some infection. So again our best course to follow in goitre, as in the other diseases before mentioned, is to clear up all possible sources of latent infection in the mouth or tonsil, in the fallopian tubes or prostate, and then to go after the alimentary tract.

When the X-ray was first introduced as a more accurate method of diagnosis in fractures, much of the complacency in regard to the methods then in vogue in fracture treatment was dissipated. We became painfully aware that from the anatomic standpoint in all cases and from the functional standpoint in many, that our methods are entirely inadequate. The result has been that the treatment of fractures has been immensely improved. Surgeons now hesitate to treat fractures without the aid of the X-ray in making an accurate diagnosis and checking up on methods of treatment and result.

In like manner the X-ray has disturbed the complacency of the dentist. Its revelations are disconcerting. Teeth that have been giving the patient little or no disturbance are found to be far from satisfactory from the standpoint of general health. Incidentally to the search for blind abscesses of the alveolar process, the work of the dentist is subjected to the most searching scrutiny. Surprising conditions are noted.

For instance, broaches and burs are found broken off and left in root canals, perforated and split roots, root fillings forced through the apex and there perhaps setting up trouble in the process, root canals that have never been properly filled, with the resulting irritation and possible alveolar abscess, fillings forced into the interdental space with its resulting irritation and infection.

In investigating a case of sub-infection, after going over the tonsil, the accessory nasal sinuses and the pelvis, we come to the mouth. Having called to our aid the rhinologist, the gynecologist and the genito-urinary specialists, we finally come to the dental specialist. We expect a report from him as to the presence of cavities, the presence of imperfection of adaptation of bridges and crowns and their condition from the standpoint of oral sanitation, the presence or absence of devitalized teeth, overhanging ledges of imperfect fillings, the condition of the gums, gingivitis or pyorrhea, the occlusion of crowns, fillings and bridges. Finally we want to know about the presence of chronic or blind abscess. The former can be found by inspection but for the detection of the latter we must turn to the roentgenologist.

A series of ten dental films mounted in order will give us the desired information.

The eradication of these abscesses and the cure of the gingivitis and pyorrhea next come up for consideration.

Naturally the extraction of the offending tooth with thorough curreting of the process is the simplest and most efficacious method. Often, however, a tooth almost indispensable to the patient is involved. Here comes in one of the newer methods of oral surgery, root amputation, the further elaboration of which we will leave to the discussants.

When conservation of the teeth can not be maintained and at the same time radical removal of the focus be made, conservation should always give way to the radical measures. Many of our patients can not afford the necessary expense of modern dental operations; for these extraction is the only thing left.

It is time we shift our point of view. No longer is a functionating tooth the only desideratum. Conservation of teeth is only permissible when the saving of those teeth does not harbor a focus of infection. The conscientious dentist must take up his work from the standpoint of the patient's general health rather than from the standpoint of mechanics.

I can not refrain from mentioning syphilis at this time. It has been my experience, that when I send a case of active syphilis to the dentist for thorough clean-up preparatory to a course of mercury, I insult the gentleman. Often he refuses to do the work. His excuse is that he will have to use these same instruments on other patients. Another observation: I often fail to find any adequate means of sterilization in dental offices.

Every instrument used on a given patient must be boiled for twenty minutes before it is used on a second. This is not only necessary to prevent the transference of the spirochæta pallida from one individual to another, but also the other organisms. One of the most promising surgeons Indiana has produced, died at forty from syphilis contracted while having work done on his teeth. One of the leading physicians in Indiana today is suffering from tabo-paresis, the result of syphilis contracted while having his throat treated by an Indianapolis throat specialist some twenty years ago. He says he never meets the specialist but that he sees red. Syphilis is not a crime; it is a calamity. The syphilitic deserves our best efforts in his behalf; he is not necessarily a physical leper to be shunned, but often the innocent victim of misplaced confidence. As long as we have heat and rubber gloves there is no excuse for turning down the syphilitic. Remember that syphilis is inoculated only by the solution of continuity of skin or mucous membrane. In many cases no one can tell whether a patient is syphilitic or not; so it is necessary to thoroughly sterilize everything that has been used on any patient before these things are again used on others.

We as medical men, expect more of the dentist than we have been getting. We want your help, your expert special knowledge, skill and experience in working out the great problem of sub-infection from hidden foci of suppuration. We are calling you in to help us cure our cases of endocarditis, pericarditis, and rheumatism; the whole group of arthritis, bright's disease, and goitre. In a prophylactic way we expect your help in the whole chronic abnormal abdomen. When these foci in the mouth are attacked sufficiently early, the secondary foci in the alimentary tract will be largely prevented and the surgeon will have less operating to do for appendicitis, gall stones, and ulcers of the stomach.

Such an opportunity for the dentist to broaden his field of usefulness has not previously occurred. Who will garner in the sheaves of golden grain that are ready for the sickle?

DISCUSSION

Dr. Carl D. Lucas, Indianapolis: It is indeed a great pleasure for our society to be honored by the presentation of a paper of such great value by one of the members of the medical profession. Ten years ago such a phenomenon would have been out of the question, for the great medical profession did not deem our profession worthy of consideration. But now their attitude is entirely changed and they have come to realize the importance of oral sepsis in general disease conditions.

Not only are our medical friends calling us into consultation, but they have gone to the extreme of diagnosing oral conditions before consultation with the dentist, and are attributing a great many of the chronic, heretofore almost recognized as incurable maladies to oral foci of infection without having a definite knowledge that such foci are really present. The easiest way, of course, is for the internist to diagnose the disease and place oral sepsis as *the* etiological factor in the production of the malady, then leave it to the dentist to cure the oral foci and thereby cure the disease. However, we do not deem it the equitable and logical method of procedure. The dentist is not capable of making a diagnosis for the internist, nor is the internist capable of making a diagnosis of dental lesions. The two professions must cooperate in their diagnosis where oral sepsis is suspected, if we expect to arrive at even an approximately definite conclusion.

We have positive knowledge of several instances where the general practitioner of medicine has attempted to treat pyorrhea by the subcutaneous injection of emetin hydrochloride, without the aid of the dentist. Such methods are absolutely futile and they not only place the physician in an embarrassing position with his patient for not having accomplished the desired result, but it gives the layman a false conception of the results which can be obtained by the dental specialist in the treatment of pyorrhea.

We are well aware of the fact that ingestion of pus from pyorrhea pockets is not necessarily responsible for the general malaise which these advanced chronic cases suffer, but we may attribute the condition to absorption of the poisonous albumin produced by bacterial action in the tissue of the pyorrhetic pockets. The same hypothesis holds in alveolar abscesses and empyemia of the sinuses. When these infective processes begin the normal resistance of the patient controls to a degree the septicaemia and if the pus produced be evacuted, even though the cause be not at the time eliminated, the individual will generate a partial immunity, but will retain the sub-infection, as pointed out by Dr. Mix.

The blind alveolar abscess, as was pointed out in the writer's paper read before the Indiana State Dental Association meeting in May, is infinitely a greater menace to the general health of the individual than the discharging alveolar abscess, or the discharging pyorrhea abscess, because the digestive juices render the microorganisms inert, thereby preventing the generation of their toxins.

The pertinent statement that "it may be good dentistry to preserve teeth which are devitalized and may serve a useful purpose in mastication, but if in so doing a focus of infection is established in the mouth it is not good dental medicine," is eminently correct and is so recognized by the educated dentist of today. We know we can make artificial substitutes for lost teeth which are practically satisfactory, and we realize also that there is no artificial substitute for good health; therefore the capable dentist first thinks of health conservation then tooth conservation.

The recent work of Rosenow in proving the elective action of germs upon organs and tissues is going to be a great factor in diagnosing the etiological factors in the production of disease. It is going to aid us in finding the heretofore obscure foci of infection. When we are able to discover these obscure foci and eradicate them we shall be able to treat the cause and not the symptoms.

By the aid of the X-ray, as pointed out by our essayist, the dentist and the surgeon are able to see their mistakes and correct them, thereby eradicating many of the heretofore obscure infective lesions and we are convinced that in the near future the dentist will require a radiograph for the confirmation of his pulp canal fillings as the surgeons are now doing in fractures. The scientific methods are the most reasonable and logical methods for a definite result and for our personal satisfaction we wish to know that our technic is correct, or if incorrect, we wish to know it so we may be able to improve our methods.

We feel that our essayist has not investigated sufficiently when he concludes that we have inadequate means for sterilization in dental offices.

In our dental college curricula sterilization of instruments is given great consideration and the importance of complete sterilization of instruments for each and every operation is preached and taught every day of the year. The same may be said of the medical schools, and even so, we find equally as many if not more infections produced by medical men than by dentists. We will venture to say that the proportion of dental offices which are equipped with the instrumentarium for sterilization of instruments and appliances and the proper technic employed is equal to that of the medical offices. Even so, we believe it not amiss for the importance of the technic to be emphasized in this connection, and we are grateful to Dr. Mix for again calling our attention to this always important subject.

We are glad to note in the closing paragraph of Dr. Mix's excellent paper that the medical profession is expecting more from their dental friends and that they are solicitous of our aid in working out the great problem of sub-infection from the hidden foci of infection. With their cooperation which is so graciously given we are to broaden the scope of our respective professions.

Dr. Otto U. King, Huntington: It does me a great deal of good to see in these latter days the medical profession cooperating with the dental profession in trying to arrive at some conclusion along these scientific lines to find the cause of these various diseases. You know in Rochester last year we had Dr. Bloodgood, probably one of the greatest men in the United States on cancer, and he is also at the head of Johns Hopkins University. We also had at that meeting Dr. Vaughan who gave us a fine address, and there was another man who read a paper on syphilis, and when he got on to the Hutchinson tooth, he got into a very embarrassing position, because he probably never read the paper which was read by Dr. Black, and when I wrote him a few days ago and asked for his paper to be published in the National Dental Journal he said he had revised his views since he heard the discussion, and would not care to have his paper appear in print. And so I am glad to see the two professions getting together and commingling, and going over these matters, because it is of mutual interest to all of us.

Now, there are two or three phases of this subject that I want to touch upon, because I think they are of vital interest to the medical as well as the dental profession.

The community's health is the total of the health of the various separate individuals that compose that community, and that which causes the sickness and death of an individual, by so much lessens the total efficiency of the community. But in addition to this, if the sickness of the individual is contagious and so likely to extend and incapacitate others, by so much more it becomes a matter of general concern. While diseases of the mouth, nose and throat directly cause but very small proportion of deaths, they indirectly cause a much larger proportion, and they do cause a very large part of the disability from sickness. I think we shall appreciate this the more if each of us thinks of the sickness that has occurred in our own families and among our immediate friends, in say, the past five years. Ordinary colds and sore throats of all kinds, practically all ear troubles, most cases of grippe, and all cases of sinus diseases would at once occur to all of you as being included, but in addition, most cases of diphtheria, scarlet fever, measles, smallpox, and other contagious diseases would come under this head because most infectious diseases find their means of entrance to the body through the nose and mouth.

TUBERCULOSIS OF THE OROPHARYNX

I am convinced that very few dentists realize the chances they are taking every day at their chair, with the dreaded disease of tuberculosis. Therefore, I want to call your attention to tuberculosis of the oropharynx.

Tuberculosis is the most dreadful scourge of mankind. In this country alone each year people enough succumb to this malady to make eight armies the size of the standing army of the United States. That is not all, It is estimated that eight or ten times this number are affected to some extent by this disease.

One death in every seven reported is from tuberculosis. Each year the world yields up 1,095,000; each day, 3,000; each minute, two of its people, as a sacrifice to this plague.

Whether we are aware of the fact or not, the dental surgeon operates every day in the mouths of those who are exhaling millions of tubercular bacilli, and try as he may, he cannot help inhaling these germs. On the other hand, many dentists, tubercular themselves, whether they are aware of it or not, from the position they occupy, in the close proximity to their patients, exhale their effluvia, which in turn goes into the nose, mouth, pharynx, larynx, stomach and lungs of their patients. So, from the very nature of our work, we are in a position to either contract or impart this, the most devastating of all diseases. You will observe, that this disease is most prevalent, and the mortality greatest, at the time in life that dental caries is most prevalent, the age at which most people visit our offices, between fifteen and forty-four years of age

The dentist seldom thinks of the risk he is taking of acquiring tuberculosis, but is ever alert and watchful lest he should contract syphilis from some of his patients. The chances of contracting syphilis while operating in the mouth of a patient are remote.

Many, many dentists have never seen a chancre or mucous patch in the mouth of a patient, but no dental surgeon escapes for a single day operating in a field rich in tubercular bacilli. It becomes most important then, that we should excercise every precaution lest we become infected while working in the mouths of the tuberculous, and equally important that we should not be the means of imparting tuberculosis to those who intrust themselves to our care, either personally of from the instruments we employ. Osler says, "No other disease is so wide-spread, or produces so much poverty and long-continued distress."

As tuberculosis arises mainly from oral and pharyngeal infection, and infective material passing into the system through the mouth, the dentist becomes a most important factor I might say, the most important factor—in preventing tuberculosis of the oropharynx and lungs.

Have you ever seriously considered this, that flies invade many dental offices? After closing hours, they feast upon the contents of cuspidors, and comet-like sputum that has miscarried, germ-soaked pellets and dressings from carious cavities and putrescent pulps, and wipings from pyorrhea pockets, rest over night, and next day, when we have both hands occupied, swoop down on us and the patient, wounding the cutis, and cutis vera, and sometimes drawing blood.

A fly will pounce upon expectorated sputum, devour it, and deposit it on food in the form of specks. According to Lord, 3,000 bacilli have been found in a single fly speck. He computes that there may be deposited within a period of three days from thirty infected flies nearly 30,000,000 tubercle bacilli.

It is not difficult to understand, that with hypertrophied turbinated bones, nasal polypi, ozena, adenoid vegetations, carious teeth, pyorrhea pockets, unbrushed teeth, chronic tonsilitis, and the effluvia and secretions exuded because of these conditions, together with the resident bacilli of tuberculosis, and those drawn in from the outside in the act of inhalation, that the lungs become tuberculous.

Dr. W. A. Evans, Commissioner of health for the city of Chicago, who is accredited with having done more for the health of Chicago than any other living man, in discussing this subject not long ago, used these words. "The importance of diphtheria I am sure is fully understood, but the enlargement of the glands of the neck, of the nose, of the tonsils, of the pharynx are not so clearly understood.

"They are due to absorptions somewhere in the nose or within the mouth; and a large per cent. of those absorptions take place through cavities in the teeth or down the sides of unclean teeth.

"We are constantly confronted with instances like this: A child has been in a diphtheria hospital and remained there until it seemed safe for the child to go home. Then the child has gone home and there has followed an infection of diphtheria in that home. What is the explanation? Simply that in some recess, somewhere in that child there was a focus of hidden bacteria and in all probability a large percentage of those infections are either in the tooth cavities or somewhere in close connection with tooth cavities."

ABSCESSED TEETH

Diseased teeth play another important part; the pus from one abscessed tooth may supply a constant infection to the membrane of the stomach, and the result is gastric catarrh. The contents of such a stomach, with the added handicap of poorly masticated food, passes on into the smaller and larger intestines where the entire mass rots or auto-intoxication is manifest with all its disastrous results.

BAD TEETH AND CANCER

In England, one woman out of seven and one man out of eleven, after the age of 35, die of cancers. Cancer is sixth on the list of diseases in our country—73,800 deaths yearly.

There are two or three facts that will stagger you when you learn that 9 to 26.3% of all cancers are found on the tongue—1-7 to 2-5 of all cancers are found in the mouth, tongue, lips or jaw. Further one-half of all cancers are found in the stomach and duodenum.

Mayo has demonstrated that 45 to 90% of probably all cancers in the stomach originate at the site of the ulcer.

Among the most frequent causes that induce ulcer of the stomach are unmasticated food, too much food, and the results produced by the consistent indigestion of the contents of a septic mouth. These factors either injure or abrade directly the epithelial layer of the stomach by impact or stagnation, or else change and distort the secretion function or infect the walls of the stomach during those resting periods of the stomach, when the hydrochloric acid is not being secreted to neutralize and retard the bacterial putrefactive activity.

PRESIDENT W. L. MYER, RENSSELAER, IND. This is a very vital subject, and if you would spare me just a moment I would like to recite to you a couple of cases in practice. In the office building in which I am located, which is in a small town, there is an M.D.; he is a right good general practitioner; he consults me and I consult with him, and with other physicians in the town. They have a local medical society and I attend the meetings once in a while. They are wide-awake physicians. I have read the paper of Dr. Hartzell's in the *Medical Journal* on the "Oral Tract and Its Relation to Systemic Diseases," and the physician of whom I am speaking also read this paper. A lady came under his care with an attack of acute appendicitis. She was immediately taken to Chicago and operated upon. After she came back, an investigation was immediately started to find the cause of the appendicitis, and this physician examined her tonsils, and brought her to my office for an examination of her mouth. I found there a lower first molar on the left side that I could put my finger on and move it laterally and move it up and down. Well, I had a hard time convincing her it should be removed, but we got it out before she left the office. Understand this was after the operation for appendicitis. There is no question in the physician's mind that this tooth was responsible for that case of appendicitis, and had we seen it sooner, possibly a year sooner, we could have prevented that fee of the surgeon in Chicago, and also her trouble. I could recite several cases that we have followed up and found streptococcus pyog nes responsible for the trouble.

Another case which came into my office was a man with full upper and lower dentures. They were constructed in Crawfordsville—I think one of Dr. Van Der Volgen's patients. (Laughter). He didn't tell me who his dentist was, but he said he had been for many years afflicted. He was of the ambulatory type—sick all the time, but on the go. He was a traveling salesman, was on the road all the time, but was never right; had a perpetual grippe. They failed to diagnose his trouble. His dentist said to him one day, "I told my wife I was going to speak to you. Your teeth are killing you." He came into my office for a little relief, and I scraped the lower denture a little, and here is the result:—he said, "I haven't felt better in years. I have been wearing this denture for about three months now, and I feel like a different man." Now, that is the patient's statement. He is not a patient of mine, but the patient of a man from down in the southern part of the state.

Another case in practice referred to me by a physician that I have told you about, was one in which he diagnosed the trouble as oral infection. She came in and I found two or three places of infection. I referred her to Dr. Lucas, of Indianapolis, for diagnosis. Dr. Lucas was out of the city, and his assistant referred her to an X-ray man, and had a radiogram made, and he sent back views which showed four different locations in the mouth, and we found there one lower crown, been in twelve years, put on in New York City; the tooth had been crowned, and it showed that the pulp had died under this crown, but there was a condition that we had not suspected at all; it was purely a blind abscess, but it was causing her quite a good deal of trouble as we found out from this X-ray picture. We are going to have to resort to the X-ray, and some of you men saw at the State Society meeting about two years ago a man that showed the X-ray pictures of root canal fillings. I have seen some X-ray pictures of my own root canal fillings. I gave a clinic one time over of Goshen on root canal fillings, and I thought I was pretty good, but you will find out, as I told you this morning in that little short paper that I read, when you see some X-ray pictures of your crowns, bridge and root canal fillings you will realize the need of conscientious dental surgery.

Dr. E. W. Ream, Crawfordsville: Dr. Mix's paper is a most deserving production of which nothing but commendatory discussion can be made. There are one or two things I might name, perhaps, that have not been touched.

Berkeley Moynihan, M.S., F.R.C.S., who occupies a strata in the surgery of England that the Mayos do here, said that before he had given this subject special attention, he had met with nine per cent. of fatalities in his surgical operations on the digestive tract. After reading Dr. Osler's statement on the subject of "Mouth Sepsis and Oral Hygiene," as well as Dr. Hunter, of the London Charing Cross Hospital, and Dr. Jessen, of Strassburg, Germany, the fathers of the oral hygiene movement, he placed his patients, prospective of surgical operations on the digestive tract in the dentist's care, and if I understand it right, the laws of England provide that dental nurses follow dental operations with prophylaxis same as the nurse here follows the physician or surgeon. In operations on the digestive tract following such care he has reduced his fatalities to two per cent.

I could not help but think while the various gentlemen were reading the papers and discussing this subject how little the average dentist knows of the inefficiency of his services. I believe that we will find out as time goes on within the next few years that we have been causing more systemic derangements and lesions than we have been preventing.

The basic reason for the differences that have existed between the dental and medical profession is in the fact that the dental profession, or colleges, I should say, sprang into existence independent of the medical college. The primitive dental college made of its product, very decidedly a craftsman, an element which yet is followed by the modern dental college to the exclusion of more important subjects in order to make a more scientific practitioner. The dental student of the past, as well as the modern dental student has not gained the information necessary on the subjects of physiology, pathology, etiology and bacteriology to make of them students of health and disease.

I can well recall the time when I was in college that very little was said about bacteriology. What we have acquired has been since we have gotten out. Today a knowledge of that subject is paramount. The dentist that ignores this fact is missing the best opportunity that ever presented itself to him.

In the face of the fact of such men as Drs. Mayo making the statement that eighty to ninety per cent. of cases that come to their surgical clinics for appendicial operations are the result of mouth sepsis. and in the face of the fact that the dental profession today is putting gold crowns over teeth and setting bridges, "which cannot be kept clean by the combined effort of patient, doctor and the dentist that made them" (Hunter), and further, in the face of the fact of the recent statement of Dr. Prinz, of the University of Pennsylvania, that there is an action going on in the enamel of the teeth analogous to the circulatory system where nourishment is carried into the enamel and waste material carried away, it is evident that anatomy, histology, physiology, pathology, etiology and bacteriology should receive attention at the hands of the dental profession.

Dr. Prinz makes the statement that the gold crown destroys the natural environment of the tooth. It excludes the contact of the tooth from the mucous membrane, mucus, saliva and the air which are as essential to the life of the pulp of the tooth as the air we breathe is to our well being. He likens this to the fact that when the roots of a beech or sugar tree, or any surface-rooted tree, are covered with more than a certain thickness of earth which prevents the air from getting to the roots, the tree dies. In the same way these gold crowns destroy the pulps of teeth.

More yet, we have such men as Hunter, who says, (and I now quote his exact words): "There is no ingenuity in the world" and that means me, just like the rest of you—"can incorporate the gold edge of the cap or crown with underlying surfaces of the root beneath the edges of the gum but what it will produce pathological conditions." I thank you. (Applause).

Dr. T. P. Hiatt, Marion: I do not know that I can add anything to what has been said. I have been very much interested in this paper, because I have been tinkering along this line of infection from pyorrhea trouble. I happen to have a very good surgeon as my next door neighbor, who has been helping me along that line, and I have been very much interested in what has been said. I would like to tell of a case I had, and it happens to be that of a physician who came to me with his daughter, and after we were through he said, "I believe I will have you examine my mouth while I am here," and in doing so I found he had an abscess of the central incisor which he claims to have been there for at least twelve years. He had had it treated a number of times without results—that is, he got no permanent results—helped it a little but finally broke out again. So I told him he was very foolish to allow that to go on and I asked him to have a radiograph made so that we could see what the conditions were. He said anything I thought was all right would be all right with him. He went to an X-ray man and had a radiograph made, and there it showed the condition of the root, showed there was an absorption taking place, that there was a necrosed bone, and the attachments of the tooth very much impaired. Well, to make a long story short, I asked him if he had had any inconvenience as a result of it, and he said he hadn't, none at all. We treated this tooth by amputating the root and curetting the abscess, and the tooth is in good shape, and about five or eight weeks from the time this operation was done he came in and he said—"I want to apologize for telling you a lie that I didn't intend to." He said, "I told you I had had no trouble whatever as a result of this infection, and I did not think that I had," but he went on to tell me that for the last five or six years he had had a condition in his shoulders and neck that had worried him very materially, and he didn't know whether it was a rheumatic condition or what it was, but it had bothered him considerably, and that since the operation that we had performed he had cured his abscess and gotten rid of his diseased bone, and it had entirely disappeared, and he was confident that the infection from this root had been the cause of it. I recite this case merely to show that right along the line of what has been said, the infection from alveolar process, of pyorrhea pockets, can cause a great many of the very discouraging systemic conditions that the physician has to contend with, and right along the line of what has been said it certainly is very gratifying to know that the medical profession is beginning to realize the help that the dental profession can render. I thank you. (Applause.)

Dr. J. V. Howard, Indianapolis: I did not come in in time to hear this paper, and I don't know what was in it. I want to appeal to you in this one respect; I believe the time to get at any one thing and care for it properly is early in life, and I believe we as dentists should care more for the children. We do not like to extract, nor take the time necessary to care for them; we push them to one side, and they go on, and it is done to the detriment of the child. Now, this case I will refer to, happened about three months ago. Late last fall a grandmother brought a little girl to my office suffering from a severe toothache. I was very busy at the time and I said, "I will relieve the little girl and you bring her in next week, when I have more time." Her mouth was filled with badly broken down and abscessed molars. So the grandmother forgot about it. Time went on, and one morning she awoke and attempted to get up; she had absolutely no more use of her feet than she had when she was two hours old. So they sent for their physician, who happened to be Dr. Torian—many of you know him, no doubt and he examined her carefully and could find no trouble, but thought probably some of her teeth were causing a disturbance. He consulted Dr. Cofield, who extracted some which took away a great deal of the trouble, but not all. One or two weeks more went along without results, and the physician took her to the hospital and removed her tonsils, and still no results. They didn't know what next to do. She continued in this condition for a little over ten weeks. One morning when she awoke she said, "Grandmother one of my teeth hurts." So they sent to my office, and I went over, and found two baby molars badly abscessed, (blind abscesses) a third badly decayed, and I removed them. The second day I went back and the little girl was able to stand on her toes the first time she had put her feet to the floor in eleven weeks. It was on Wednesday night that I removed the teeth, and on Sunday noon I stopped again to see how she was getting along, and she came to the door to meet me, still walking on her toes. It was two weeks before she could walk normally. The little girl is now perfectly well and in good shape.

Dr. ————:* I think this matter of oral infection that causes systemic disturbances is the most vital matter before the dental profession at this time, and I believe that we are going to find out that there can be no such a thing as being a specialist in anything which concerns the welfare of any part of the body, separate and distinct from a general knowledge of the body. And I think we are beginning to find out that we cannot be dental specialists without being general practitioners of medicine. And I think, too, that we cannot consider dentistry purely a matter of mechanical procedure. And yet, I wonder if there is not a danger of over-emphasizing the fact that there is a value in the teeth and the oral cavity in its natural condition, in its relationship to the general health of the body. I sometimes think that we talk too flippantly and too carelessly in regard to extraction of the teeth, and the oral cavity, and I believe sometimes we as dentists do not place enough value in the teeth as a contributive factor to the general health of the body. Now, I find in my practice that I will have patients who have come from physicians there in the city, to my office with instructions that such and such teeth must be taken out, and they include that it is a focal cause of infection and it doesn't matter much anyway if you do lose the teeth, and if it does any good, all right, and if it doesn't you haven't lost much. We do not take that stand in regard to the eye, or the ear, or arms, or the legs. If there is any infection which we locate in any of those organs, we do not say, "Gouge out the eye or amputate the arm," but we try to remedy and eliminate that infection and preserve the organ as near to its natural state as it should be, and I think that ought to be our attitude and stand in regard to the oral cavity. You cannot tell me that any man or woman's health is as good after their teeth are gone, or partly removed, as it was or might have been if those teeth were in their natural healthy condition. It seems to me that if the line on which we are going now is carried out in its drastic form, we better set ourselves up to be simply extracting specialists, and start up in the business of making dentures, or possibly prescribe that in the beginning. You know as well as I do that artificial teeth are simply a substitute for something—better than nothing, but as a substitute for the natural teeth in their healthy condition they cannot in any measure attain to any substitution for them, and it has been said that it means the matter of shortening the life of people who have to resort to it. And I think there is a serious mistake going to be made, and I think there is a serious proposition before us at this time, whether or not we ought to take the same attitude toward the oral cavity and the teeth that we would toward any of the other organs of the body, which we do not consider in the flippant light we are now inclined to do in regard to the oral cavity as the focus of infection. (Applause).

*Will the author of this discussion kindly send his name to The Dental Summary?

Dr. G. M. Mix, Muncie: (Closing). This very enthusiastic and flattering discussion that my humble efforts have met with is indeed pleasing, and I will take up just briefly a few points that have not been brought out in the discussion. Obviously, it is impossible without wearying you to go into endless details that might be elaborated in regard to the thesis under consideration. I certainly heartily endorse the remarks by our distinguished friend from Indianapolis, Dr. Lucas, in regard to the foolishness of medical men injecting emetin hydrochloride into their patients to cure them of pyorrhea. It is a silly procedure, and just like many things that our profession is guilty of, it is a case of being exploited by the pharmaceutical houses. A pharmaceutical house gets out a bulletin on emetin, a cure for pyorrhea, and some doctors, I am sorry to say, depend for their literature on the bulletins of the larger pharmaceutical houses. (Laughter). And so Mr. Parke, or Mr. Davis, or Mr. Mulford says, "Use emetin and cure your pyorrhea," and they all use emetin. It is absolutely assinine. We will not say anything about how to do it, because you men know how, and we turn it over to you.

In the discussion by Dr. King, he mentioned some of Dr. Mayo's findings in regard to the etiology of ulcer of the stomach, which in a way means the same thing, but getting at it in a little different way. I do not think that Dr. Mayo has said or decided that hot food, or bolted food, or too much food or too little food, or cooked food or raw food, or appetite, or the lack of appetite is the cause of gastric ulcer, because he is employing Dr. Rosenow at a large salary to work out the etiology of appendicitis and gall-stone diseases, gastric ulcer, etc. Dr. Rosenow is the man I have quoted from tonight who is working it out from a purely bacteriological standpoint, and from the standpoint of focal infection as we have tried to outline.

I was interested in the remark in regard to the reduction of mortality in Dr. Moynihan's clinic. I visited him last year in Leeds, England, It is undoubtedly true that the attention to oral sepsis in his clinics has produced the results that he refers to, from eight to two per cent., but it would not happen over here. The average mouth in this country is taken care of so that it would not fall into that eight per cent. class. It is pretty near down to the two per cent class already, because we do have good dentistry in America, and they do not have it over there. Really, every seventh person that I met in London had a handkerchief around his neck with an alveolar abscess. (Laughter). Now, how often do we see acute alveolar cases going around in the streets of America? Pretty rare. It is so rare that I omitted that phase of the subject from my paper altogether tonight. We see so few, because they are so few. You see them all the time over there. The front of the mouth of the average good looking English woman—now, that is maybe putting it a little strong, for I expect some of you have friends over there—but, a whole lot of them, beautiful woman, all except when they open their mouths, and then you see that it is a whitened sepulcher, but there is rottenness within. (Laughter).

Dr. Hiatt is very fortunate to live right next door to a good surgeon; and the suregon is mighty lucky to live next door to Dr. Hiatt. Really some of the pleasantest associations that I have formed in my professional work have been with the dentists, and we are certainly drifting together, the medical men and the dentists. In other words, the time is ripe for the dental school to go out of existence absolutely. The dental school is simply a department of the great medical school of the country; it should be. I don't know how soon that will come. I hope it will come right off, because I do not like to speak of the dentists—I am sick of that; we want to speak of the dental medical man.

In regard to this question of the conservation of the teeth: that is a very practical thing, and if you fellows will give us a clean mouth so that we can make an X-ray picture of it and it will show us a clean mouth, we do not care a rap how many teeth you save. But now, how much is that going to cost? I have got a patient right now, an excellent woman. Her husband works at $1.50 a day, and works every day, and does the washing for her besides, and she is suffering from a certain amount of oral sepsis undoubtedly; she is pretty nearly a wreck. Now, she ought to have a nice lot of work done; she ought to have one hundred dollars' worth of work done in her mouth—go over the thing with the X-ray, take out all these foci, amputate the roots; and if she was in Indianapolis, instead of where she is, it would cost her one thousand dollars instead of one hundred dollars, and her husband is working for $1.50 a day. (Laughter). So, don't blame us if we send our patients to you and say, "Pull out those dirty old teeth." She has suffered for twenty years with it, and it has undermined her health. Let's get rid of it. Those are questions that will be worked out, and gentlemen, I am glad to have met with you tonight, and I am not going to tell you what bully good looking fellows you are, because you all know that by looking in the glass in the morning. (Applause).

Adam and Eve had many advantages but the principal one was that they escaped teething.—*Mark Twain.*

EMETIN*

BY E. A. HONEY, D.D.S., KALAMAZOO, MICH.

EX-PRESIDENT MICHIGAN STATE DENTAL SOCIETY

THE PUBLICATIONS of last year were replete with articles concerning the amœba theory of pyorrhea, and the use of emetin as a treatment, which, almost without exception, were strongly affirmative and corroborative of the theory. During the present year there have been even more writings upon the subject, and of these, the majority in number and perhaps balance in weight, have been against the theory of emetin medication.

Among the first of these is that of the report of work done by Thos. B. Hartzell, *Jour. National Dent. Assn.*, 1915, page 122, in which he has sought for the ultimate cause of pyorrhea. He makes the unqualified statement that "streptococci are the principal organisms of pyorrhea and that amœba and all other germs are contributory factors only." In his investigation of the efficacy of the emetin treatment he used one quart of a one per cent. emetin solution according to the technic suggested by Barrett. He says: "The writer's experience has been that the injection of emetin hydrochlorid has not in a single instance stopped pus flow, though amœbæ were found to be present in three-quarters of the cases." In conclusion, he takes the view that the amœbæ are the secondary inhabitants of every filthy mouth and that they act as scavengers to engulf bacteria and render them harmless. He has actually counted as many as 70 organisms in one amœba. He therefore considers the amœbæ to be of benefit to the tissues, acting in the capacity of scavengers, rather than to produce or promote disease.

In the same issue of the above journal, W. A. Price reports a careful study of the various forms and varieties of amœbæ occurring in the mouth. This study he has accomplished by means of the moving-picture film, portions of which are shown in the illustration. The writer then sums up the arguments, both for and against the acceptance of the amœbic theory, and the use of emetin for pyorrhea. In conclusion he says in substance, that the theory is still unproven, and is not substantiated by the evidence which has been thus far presented.

Eugene Talbot has issued two articles during the year on the amœba question. The first appeared in the *Dental Cosmos* for May, 1915, in which he makes a criticism of the claims of Barrett on the ground that the amœba has not been shown to conform to the laws of Koch. These laws are as follows:

1. The organism must be present in all cases of the particular disease.

Read before the Michigan State Dental Society, April 13, 1916.

2. The organism must be isolated from the diseased body and propagated in pure culture.

3. The pure culture of the organism when introduced into susceptible animals must produce the disease.

4. In the disease thus produced the organism must be found distributed as in the natural disease.

The writer further claims that Barrett himself is not very confident of the efficacy of emetin in the treatment of pyorrhea as he has suggested the use of iodin in conjunction with it. He asks why, when there are 150 varieties of organisms to be found in the mouth, the amœba, which is seemingly the least harmful of all, should be selected as the most important. He then asks why not use the "Krupp siege gun" of iodin, and kill them all at once.

Dr. Talbot's second article appeared in the DENTAL SUMMARY for July, 1915. In this he takes up a historical review of the literature and writings upon the various forms of amœba, especially those which may occur in the mouth. It is a splendid resume of the literature upon this subject. He concludes his article by restating his belief that amœbæ do not produce interstitial gingivitis.

An article by T. Sidney Smith appears in the *Journal of the American Medical Association*, for May 8, 1915, in which he reviews the history of the emetin treatment for pyorrhea, and points out that none of the enthusiasts for this method of procedure claim that it will cause the pocket to close up by healing of tissue. All that is claimed is the reduction of the signs of inflammation about the teeth and the stopping of the pus flow. In order that actual healing may take place, careful surgical work must be done on the roots, in view of which he questions how much of the beneficial results are due to the emetin, and how much to the mechanical cleansing of the parts. He closes with a plea for more thorough study of the question.

Perhaps the most notable investigation of this problem which has been reported during the year, is that which was done by Sanford and New of the Mayo Clinics, and was published in the *Journal of Surgery, Gynecology and Obstetrics* for January, 1916. They review the literature and report experimental work which included the examination of 327 cases. Among these there were 55 per cent. in which the amœbæ could be demonstrated. They noted that the number of amœbæ positives increased as the severity of the disease increased, which they attributed to an increase of pathological change in the mouth suitable for the growth of these organisms. In 33 cases of evident pyorrhea amœba were demonstrated. Emetin was administered either hypodermatically or by Alcresta Tablets. In every instance the amœbæ could no longer be found in from four to seven days. "On the other hand, we did not observe the marked improvement locally that has been reported from many sources. Some of the patients felt much better generally, but we question if the therapeutic action of emetin does not owe its value to some general effect, which has not as yet been demonstrated experimentally by pharmacologists or recognized by the clinicians. The patients were then sent to have thorough dental surgical treatment without further medical treatment and after this, an improvement was noticed." In conclusion they say, "we recognize the very just criticism that we have in no way disproved the possibility of endamœba buccalis as the cause of pyorrhea. We do hold, however, that the burden of proof still lies with those who claim the pathogenecity of this organism and that there should be further attempts to produce the disease experimentally."

Two articles of special merit supporting the amœba theory of pyorrhea have appeared. The first of these is one by Smith and Barrett in the *Dental Cosmos* for November, 1915. In this they attempt to explain their view of the relation of the amœba to the other organisms present in pyorrhea. They believe that a certain symbiosis or mutual relationship exists between the amœba and bacteria so that together they may produce an effect which is not possible to either alone. To destroy this symbiotic action they say that either the bacterial or the amœbic elements may be destroyed; the one is accomplished with vaccine, the other with emetin. They believe that tartar is secondary to and produced by the pyorrhea. They believe that an attempt should be made to remove the deposits but that it should be done with great care, and injury to the soft tissues should be avoided. They state that the failures resultant in the use of emetin are due to (a) use of the remedy in forms of suppurating affections about the teeth in which it should not have been so applied with expectation of favorable results; (b) its use in an improper way. The treatment suggested is to preferably use the emetin by injecting a ½ per cent. locally into the pockets. They emphatically state that the stomachic medication such as Alcresta ipecac has no beneficial effect.

The second affirmative paper was written by E. N. Beall and appeared in the *Dental Cosmos* for April, 1916. He reviews the pro and con literature regarding the question and takes exception to the articles of Talbot and Hartzell on the ground that their reasoning is illogical. He objects to the statement that the amœba do not answer to Koch's rules on the ground that it is exceedingly difficult and often impossible to obtain specimens in many cases, in which the organisms are deeply seated. The writer believes the amœbæ to be carriers of the streptococcus viridens and compares them to the manner in which flies carry typhoid and the mosquitos carry malaria and yellow fever. He cites a number of cases in which he presents clinical evidence in support of his claim that emetin is a valuable adjunct to the mechanical measures in the treatment of pyorrhea.

In this connection the Department of Health of New York City made an investigation of the mouths of children and have published their results in the *Journal of the American Medical Association* for December 11, 1915. They state that in the examination of 1,000 children that of those between ages five and fifteen, 60 per cent. had amœbæ present, and that of those between ages five and fifteen, 60 per cent. showed the presence of the organism. In the normal and healthy mouths the per cent. was 29, and as the oral conditions grew worse, the number of amœbæ positives increased up to 91 per cent. This is in direct contradiction to the statements of Barrett and Bass, who say that the organisms are not found in healthy mouths. Experimentally the New York Department of Health found that an ordinary cleansing of the mouth reduced the amœbic count over half, while with the use of a mouth wash, containing emetin 1:400, the amœbæ were reduced 90 per cent.

A substantiation of this work is to be found in an article by Percy Howe in the *Dental Cosmos* for April, 1916. He reports an examination of 100 unselected cases of children in the Forsythe Infirmary, and finding among these a large per cent. who have amœba in their mouths. Some of the amœba positives had mouths which were sweet and clean and healthy, while a larger per cent. were to be found in the diseased and unhealthy mouths. He questions whether amœbæ are really parasitic, inasmuch as he failed in several attempts to transplant them in dogs' mouths. In his summary he states "(1) The oral endamœba are not standards by which to detect pyorrhea alveolaris. (2) There is no proof that these organisms are parasitic. (3) Experiments on animals show them to be harmless. (4) The so-called symbiotic relation is merely a theoretical supposition. (5) Emetin is therefore not a specific for pyorrhea." He then concludes with the statement that "The endamœbic theory of pyorrhea alveolaris is believed to be a preconceived theory based upon an analogy which investigation does not support."

As regards the text book on the subject of Alveolo-Dental Pyorrhea, by Bass and Johns, two extremely unfavorable criticisms appeared, one in the *Journal of the American Medical Association* and the other in the *Dental Cosmos*. From the former of these, the following excerpt is taken:

"The statement that pyorrhea alveolaris is cured by emetin also needs further evidence. That some patients are temporarily helped, there is little doubt; but that this disease is cured permanently by the drug, does not coincide with general experience, and this is admitted in the book, since relapse is indicated; besides it is acknowledged that surgical means are demanded in some cases. If the peridental membrane be so far destroyed that local treatment will not effect a cure, then no remedy which cannot restore the investing membrane will be effective. The peridental membrane being an organ, once destroyed, cannot be restored, as is stated by the authors. This membrane when once gone leaves no means of vital attachment of the gums or other approximating tissues to the tooth's root; therefore the pockets caused as a result of destruction of the peridental membrane must remain, unless surgically obliterated. Otherwise, the pockets are a constant source of reinfection. The book contains well-stated truths, and not a few fallacies. * * * The positive statement that pyorrhea alveolaris is caused by the endamœba and that emetin hydrochlorid is specific for this disease is unfortunate. It has permitted enterprising drug manufacturers to flood physicians and dentists with literature copied from those who have made these positive statements, and, as a result, the drug is being used indiscriminately without sufficient knowledge to justify it."

The second review points out many absurdities in the book and concludes with this statement:

"The book is a fine example of pseudo-scientific guesswork, in which its authors betray among other things, a notable lack of knowledge of the literature of the subject with which they have essayed to deal and concerning which they nevertheless distinctly pose as authorities. Its short-comings are so self-evident and its hasty and ill-considered statements are so manifest that the reader may well marvel at the temerity of its writers in bringing out a work which comes perilously near to being an insult to the intelligence of the large number of scientific workers who have for years given thoughtful study and consideration to the same problem. The publication adds nothing to our knowledge of 'alveolo-dental pyorrhea,' though it may serve to confuse the issue in the mind of the untrained student. It can, in our opinion, serve no useful purpose, other than to possibly add to the income while it detracts from the scientific reputation of its authors."

A REVIEW OF DOCTORS BASS AND JOHNS' BOOK ON PYORRHEA*

BY C. E. HARPER, D.D.S., DANVILLE, VA.

WHAT IS PYORRHEA ALVEOLARIS? What are the causes and how is it diagnosed and how treated?

These questions that have agitated the dental profession for many years, and are likely to continue to occupy an important place in dental and medical journals for years to come. The etiology, causes and treatment of pyorrhea alveolaris are still under discussion, also as to whether it is of local origin, or systemic, or both; whether it causes systemic troubles or is the result of them.

A great many different names have been given the disease. Pyorrhea alveolaris means discharge of pus around the alveoli. This name is all right for the advanced stages, but hardly applicable to the first stages. In the year 1850 Dr. Riggs was the first to call attention to the disease, and for some time, and even at the present time, it often goes by the name of "Riggs' Disease." By whatever name we may call it, it is one of the most destructive diseases to which man is heir today.

Dr. Barrett, in his book on Oral Pathology, says:

"For many centuries it has been doing its destructive work without remark and without any attempt to determine its pathology."

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*Prepared for the Virginia State Dental Association, November 4, 5 and 6, 1915.

Dr. Barrett further remarks that he has in his possession a skull of an African gorilla, an animal that it has been impossible to keep in captivity, in which the characteristic appearance of the disease exists unmistakably.

A great many different methods of treatment have been used and are being used today. In August, 1914, Dr. M. T. Barrett, of the Dental Department of the University of Pennsylvania, published a report of his work on Pyorrhea Alveolaris. He examined forty-six cases, and in every case endamoebae were found to be present in the pyorrhea pocket. Thirteen of these cases were treated by the local application of emetin hydrochlorid solution, which quickly caused the endamœbæ to disappear, and produced prompt relief and apparent cure. In a later publication he reports seventy-three cases treated with emetin, of which all but one may be said to have been cured.

In November, 1914, Doctors Bass and Johns, both physicians, published an article on pyorrhea and their method of treatment with emetin. Some one has said that of late the medical profession has gone into hysterics over the treatment of pyorrhea, and condemn the dentist who hesitates to accept the findings of members of their class as one hundred per cent. pure. "For some reason the M. D. seems to think he cannot disgrace himself outside of his own profession."

During the year 1915 Doctors Bass and Johns, ot the Tulane Medical College, published a book on pyorrhea, its causes and treatment. In the preface of their book the authors say: "It happens, as it seldom has happened before in the history of medicine, that whenever the specific cause of the disease was found, a specific efficient remedy against the parasite was already known." The name given by the authors to the disease under consideration is "Alveolodental Pyorrhea," which is defined as a destructive disease of the supporting structures of the teeth, the specific cause of which is the endamœba.

Amœbæ belong to the lowest organism in the animal kingdom. They are found in large quantities in streams and stagnant pools of water. To those amœbæ which are parasitic to man has been given the name "endamœbæ." The authors assert that the endamœbæ are present in all lesions and are not present in the absence of pyorrhea.

Secondary factors, one or more of which no doubt are essential, are, wounding of the gums at the point of attachment to the teeth, lack of oral hygiene, and possibly individual resistance. Damage to the gums producing favorable soil for infection may be done in a number of ways, among which are picking the teeth, cleaning with hard brushes, floss silk, hard particles of food between the teeth making pressure on the gums, tartar on the teeth, ill fitting crowns, etc.

The disease begins by bleeding of the gums; discharge of pus, foul breath, loss of the peridental membrane and alveolar process follow; the teeth become loose and finally drop out, or are removed on account of pain. The authors say that "if every body's breath smelled to himself like it does to the other fellow, and if it was known by all that the odor results chiefly from pyorrhea, it is doubtful whether there would be enough ipecac produced in South America and India combined to supply the demand." They state as to the amount of pus discharged that "at least four drops can be secured from the average pyorrhea pocket during twenty four hours. When mixed with the saliva and swallowed, it is not noticed, however. This would be an ounce in one hundred and twenty days, or three ounces in a year. We believe it would be a very conservative estimate to say that the average tooth suppurates more than ten years before it is finally removed by pyorrhea Then about one quart of pus would be produced for each tooth, and for all thirty-two teeth, about eight gallons. The disgusting thought about it is that all this eight gallons of pus is produced in the mouth, and that most of it is swallowed. It would be no great surprise if the production and loss of this large amount of pus should have marked harmful influence on the health and perhaps the longevity of the individual."

The authors say, with reference to salivary calculus, "What is called salivary calculus and thought to be due to the precipitation of calcareous material from the saliva is in fact *due* to pyorrhea. It is now generally thought to be the cause of pyorrhea, in some cases at least, but we feel certain that it will be found to be the result, rather than the cause, of pyorrhea. One of the things formerly thought to be the cause of pyorrhea is malocclusion. Instead of malocclusion being the cause, pyorrhea is the cause of much of the malocclusion seen."

"The opinion is held by quite a good portion of the medical profession that pyorrhea is the source of various systemic diseases. We are not prepared to express an opinion one way or the other. It must be confessed that it is not proved to be so, however much he may believe it. The fact that a patient who is suffering with one of these systemic diseases also has pyorrhea is not sufficient evidence that there exists any etiologic relation whatever between them, because practically all other grown people who have not such systemic disease have pyorrhea also. On the other hand, it would seem that the chances of pathogenic bacteria reaching the blood through pyorrhea lesions is great."

Before we knew the specific cause of pyorrhea and how to diagnose the disease certainly in all stages, it was impossible to know whether or not it was contagious. Practically all adults have the infection and may, therefore, be a source of infection to others. If one member of a family has the disease, it may be given to the other members by drinking out of the same glass, kissing, etc. In this way it can be given by the husband to his wife, or the wife to the husband, or the father or mother can give the disease to their children. When the father or mother has the disease nothing short of the individual drinking cup in the home can prevent the children from contracting pyorrhea. We are often asked whether the disease is "catching." To this we reply there is not the slightest known evidence that endamœba lives and reproduces anywhere except in the mouth and adjacent structures of man, and perhaps certain animals, and since the parasite is the essential cause of pyorrhea, it is "caught" from some other person in every case. Everybody who has pyorrhea got it from somebody else, usually by putting more or less saliva and pus from the other person's mouth into his own.

The spread of pyorrhea would be soon checked materially if the facts that we now know about the disease could be brought clearly to the attention of the public. If the real facts were known, the pernicious habits of drinking and eating after each other, kissing in the mouth, etc., would be rapidly reduced, at least. The symptoms of pyorrhea are bleeding gums, soreness of the teeth and gums, bad taste in the mouth, foul breath, sensitiveness of the necks of the teeth, retraction of the gums, looseness of the teeth, changes of the position of the teeth, gum boils, etc.

Pus can always be demonstrated by competent microscopic examination. In diagnosing pyorrhea, the first thing necessary is to suspect the presence of the disease. On account of the great prevalence of alveodental pyorrhea one may feel practically sure of its existence, to some extent at least, in almost all adults, and in a large percentage of children. Its presence should be suspected in all people until proved otherwise. The history of the case should be gotten from the patient as to bleeding gums and the symptoms just given, and microscopic examination for endamœba.

The treatment of alveodental pyorrhea has for its object, first, the destruction of the endamœba, the specific cause of the disease; and, second, the healing of the existing lesions. Since the damage done by the disease consists largely of destruction of structures and tissues, it would seem that little repair of the damage done could be expected. Nature can no more grow new alveolar bone after it has been removed, nor grow gums back on to the part of a tooth from which it has retracted, than she could grow a new tooth in place of one that has been lost, or a new limb in place of one that has been amputated.

For the purpose of obtaining the first object mentioned, we are fortunate to have a drug, ipecac, which is highly toxic to endamœba. We can destroy the endamœba with the specific ipecac treatment; we have to depend largely upon nature's processes for the healing of the diseased or damaged tissue. Their method of giving emetin is to inject hypodermatically one-half grain daily for three or four days, and repeat the treatment for one or more days, after an interval of three to ten days. Endamœbæ disappear from all lesions following from one to three days treatment, in more than ninety per cent. of all cases. They disappeared in ninety-nine per cent. of our cases following at least six days' treatment." Hypodermatic injections of emetin have many objections, and a form of ipecac has been made called Alcresta Ipecac, that can be taken by the mouth, which does not produce nausea as it is not dissolved in the acid solution of the stomach, but is set free in the alkaline intestinal secretion. This preparation is given as follows: two tablets three times a day, before meals, for six days. The authors have found this method equally as good as emetin given by hypodermatic injection. With reference to scaling the teeth they say:

"There is a deep-set opinion held by the dental profession that it is important to scale or scrape these deposits off to facilitate healing. This might be true if there was any hope that the destroyed peridental membrane would be re-grown, and again cover the root of the tooth where it formerly existed. We have not the slightest evidence, however, that such a thing can occur. Apparently, therefore, the only benefit that would result would be what results from cleanliness and removal of foreign material, which may in some instances be a source of irritation. However, if done properly, no harm would result." "Cutting away the gum that makes the pocket, then converting the pocket into a wide open, freely draining lesion very much facilitates healing."

The chapter on Prophylaxis says: "As has been shown alveodental pyorrhea is caused by a specific living microscopic animal parasite endamœbæ which lives as a parasite in the affected tissue. These endamœbæ, however, are harmless when applied to normal gums. They cannot take hold and establish themselves on normal mucous membrane any more than tetanus bacilli applied to the normal skin could produce tetanus. Not only must tetanus bacilli be introduced into the tissue, but that tissue must be damaged, crushed, dying or dead, to constitute favorable soil for the organism to start growing in. The wounded gum that will make a favorable lodging place for the endamœba may be caused by use of the tooth pick, dental floss and rubber forced between the teeth, hard particles of food and the tooth brush."

"If the bristles of the ordinary tooth brush be examined under considerable magnification with the microscope, the end of each one resembles a coarse nail, and many of them very sharp pointed. Tooth powders and pastes containing powders are harmful, and may be a source of alveodental pyorrhea. It may be advisable to polish the teeth once in a great while with such preparations, in which instance it should be done with care."

In order to prevent re-infection, after a patient has been treated with Alcresta Ipecac or emetin, instruct the patient to use as mouth wash at night, two drops of fluid extract of ipecac in half-glass of water.

The authors conclude by stating: "that if ipecac was used in this manner from childhood through life, it is doubtful whether the individual would ever get the disease."

If there is one thing that you may certainly rest assured about, it is this—that you will never get big results without expenditure in some form or other. Everything must be bought.

—*Sir John Collie.*

THE PRO AND CON OF DESENSITIZING PASTES*

BY E. T. LOEFFLER, D.D.S., B.S., ANN ARBOR, MICH.

EX-PRESIDENT MICH. STATE DENTAL SOCIETY
PROFESSOR OF THERAPEUTICS IN THE DENTAL DEPARTMENT OF THE
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A FIFTEEN MINUTE PAPER on any subject must necessarily be limited to a mere statement of facts and observations by men prominent in the profession, especially those who have given the matter special attention.

The prevention of pain while excavating hypersensitive dentin, on account of its frequency and the traditional fear of the dental engine, is more important than for any other operation in the oral cavity. In the comparison of efficiency of general and local remedies, a principle has been established, that the nearer an agent can be applied to the site of disease, the more effective and positive will be its action. In the treatment, therefore, of hypersensitive dentin, a local remedy is specially indicated. On account of the peculiar structure of dentin, however, and the difficulty in application, the action of local agents are often disappointing.

An ideal desensitizing paste for hypersensitive dentin should conform to the following conditions:

(1) Ease and painlessness of application.

(2) Rapidity of action.

(3) Limitation of action to the dentin, with sufficient penetration to allow the painless preparation of the cavity.

(4) Non-irritation of the pulp, both at the time of application and afterwards.

(5) Absence of discoloration.

Thus far, no drug, agent or method has been introduced that conforms in every detail to the above exacting requirements. On account of the lack of perseverance or experience, perhaps the failures have been so many that many of the best operators are still depending upon the skillful use of sharp instruments. Desensitizing pastes that are found on the market, if limited to special cases and requirements, and used according to directions, meet the above mentioned conditions to a certain extent at least, excepting their limitations of action, and detrimental action on the pulp.

Paraform, the active agent in most of these pastes, is exceedingly powerful and penetrating, a protoplasm poison and must be used with the utmost caution and with a definite knowledge of its action. It is specially useful in shallow hypersensitive cavities in which a dressing can be left in for a

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week or more. It should never be used in a greater proportion than 5 per cent. and never in deep cavities, except when it is necessary or desirable to remove the pulp.

Paraform should be mixed with some filling material, never more than 5 per cent. and be evenly distributed throughout the mass. A most convenient form is that made with temporary gutta percha, in which case a minimum amount of heat should be used on account of the tendency of paraform to volatilize. Another form of paraform paste may be made by mixing it with oxy-sulphate of zinc, or better still, finely powdered silex, and an aqueous solution of gum arabic or petrolatum. Any of these preparations should be sealed in from 7 to 14 days.

THE "PROS" OF PROMINENT MEN IN THE PROFESSION

Dr. J. P. Buckley, Chicago, Ill., is the originator of the following formula, as a desensitizing paste:

Neothesin	3	grs.
Thymol	3½	grs.
Trioxymethylene	21	grs.
Vaselene-q. s. to make	1	dram.

Dr. Buckley, in the 1915 *Cosmos*, page 794 to 796, makes the following statements: "A great deal of experimenting was done by myself in the laboratory, and after the formula was worked out it was given every clinical test, both by myself and others. It was found that the remedy will not affect sound dentin to any appreciable depth: and if used in cases in which there is sound and healthy dentin intervening between the cavity of decay and the pulp proper, it is absolutely impossible to devitalize the pulp or affect it deleteriously with this remedy. The remedy is recommended only for the treatment of hypersensitive dentin in which the pulp is uninvolved. In such cases the sensitiveness of the dentin will always return in a short time."

Dr. Goslee and Bentley, of Chicago, and Dr. Conzett, of Dubuque, Iowa, have had very gratifying results in the use of Dr. Buckley's Paste. Dr. Goslee reports over 200 cases without the loss of a single pulp; and Dr. Bentley the loss of but one pulp in 130 cases. Dr. Bentley states in conclusion: "From the experience I have had, I am willing to take the chance of 130 to 1, for the benefits received." In the same article, Dr. Conzett says: "You may say that I unqualifiedly indorse the paste, and use it constantly." (1915 *Cosmos*, page 795.)

Dr. Van Horn, Bloomburg, Pa., in *Cosmos*, 1915, page 1236, states: "During six months' use of Dr. Buckley's paste in various cavity conditions I have had no unfavorable results, and Dr. Buckley has rendered a distinct service to humanity which the dental profession should not soon forget."

Dr. F. W. Fredircton, N. B., in *Items of Interest*, 1915, pages 561-563, gives an unbiased report of his experience in the use of Dr. Buckley's paste. He states "That with care and in well selected cases, properly sealed in, the results are very satisfactory; that the method is greatly appreciated by the patient, and affords a clear field for the operator."

"PROS" AT THE DENTAL COLLEGE OF THE UNIVERSITY OF MICHIGAN

It must be apparent to all, that any drug, agent, method or remedy used for the relief or prevention of pain while excavating hypersensitive dentin, is more or less dangerous when placed in the hands of the average practitioner. As stated in a previous paragraph, on account of the peculiar structure of the dentin any agent used as a desensitizing paste must possess a decided penetrating power. The pulp on the other hand, being a highly vascular and very sensitive organ, is extremely sensitive to shock. Whether this shock be chemical, traumatic or mechanical matters little, provided it be sufficiently intense.

Our experience in the college clinic in the use of Dr. Buckley's Paste and other pastes containing paraform, in over 200 cases, has been very satisfactory. My own experience, both in the college clinic and in my private practice, leads me to make the following statements: Desensitizing pastes, containing paraform, used in the treatment of hypersensitive dentin, when the pulp is not involved, will give uniformly gratifying results. In shallow cavities I have noted in particular that its penetration is limited. In a few cases it has had no effect at all, even after repeated applications. In one special case, the paste was left sealed in for one year, and the dentin was in a perfectly normal condition. In several well defined cases, the paste was placed directly on the exposed pulp and sealed in for one week, but without any apparent effect. The effect produced in one cavity does not affect the sensation of the dentin in another cavity of the same tooth. This latter experiment has been carried out in a large number of cases.

THE "CONS" OF DISTINGUISHED MEN IN THE PROFESSION

Dr. Hermann Prinz, in *Cosmos*, 1915, page 853, gives a very comprehensive article in regard to the composition, nature and action of Dr. Buckley's formula. The following is a resume of his findings:

(1) Formaldehyde gas as liberated by the paste is the only agent in the compound. The amount of neothesin is too small to have any effect.

(2) Formaldehyde gas is absolutely non-self-limiting.

(3) In the application of this paste there always is danger of injuring the pulp.

(4) The severity increases in proportion to the amount of penetration.

(5) Formaldehyde gas kills living tissues.

(6) Experimental work and increasing reports of deaths of pulps from the application of this paste, proclaim the agent unsafe.

Dr. Alfred R. Starr, New York City, in *Cosmos* of 1915, page 545, states that his first experience with Dr. Buckley's paste was not marred with any disagreeable results, but that later on he had many cases of pulp hyperæmia and a few cases of devitalization. Also a few cases of persistent pulp irritation even in shallow cavities.

Our experience in the College Clinic of the U. of M.:

Since beginning of 1916, by very careful observation, both on the part of patient and operator, the following points have been noted with regard to the action of various desensitizing pastes.

(1) A careful history of the case may reveal some interesting facts that would otherwise escape notice.

(2) In a very small per cent. of cases the dentin does not seem to be affected.

(3) In at least six well defined cases for bridge abutments the pulps were completely devitalized by means of the paste, inside of two weeks.

(4) In a large per cent. of cases the paste produces more or less irritation and pain, varying from a few hours to several days.

Conclusion: There is a true saying that "The evil that men do, lives after them, while the good is often interred with their bones." An analogous statement as the following would be equally true: "The bad features or qualities of a remedy are frequently magnified, while the good ones often escape unnoticed." The pain and irritation produced by these pastes constitutes no real objection to their use. It cannot be severe, because it so often escapes unnoticed. Arsenic trioxide has been used for pulp devitalization for a great many years, and yet it often produces more or less pain during its action. On account of some excellent features involved and insufficient data with regard to the effect on the pulp, a further and more thorough investigation of the subject seems necessary.

PRESIDENT'S ADDRESS

BY DR. F. WARD HOWLETT, JACKSON, MICH.

PRESIDENT MICHIGAN STATE DENTAL SOCIETY

WITHOUT ANY PRETENSE of delivering to you an address of oratory or one of a scientific nature, and without an apology for the infliction you brought upon yourselves when you elected me your president a year ago, I greet you.

It is a great pleasure for me to open this, our Sixtieth Annual Meeting, and bid you welcome. We know that some of the most remarkable orations in Congress have been delivered to a bare quorum, but this is an exception so far as the merit of the oration is concerned. However, I assure you that the program you have before you is not an exception and when the gavel falls on Saturday you can truthfully say, "It was the best meeting of our Society." Every year we are able to make the same statement, and there seems to be no limit to what we can do. Our Society is constantly increasing its membership, and much credit should be given to the Membership Committee for the results it has accomplished.

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*Read before the Michigan State Dental Society, April, 1916.

Each year the officers accept their duties more seriously, and fully realize that they must give much of their time and energy to fulfil the trust given them. Now, are the district officers doing their share to stimulate local interest? I believe not. This brings me to the subject of my text.

In every line of activity the slogan is "*Efficiency*". So, in order to build a better, stronger and greater society, we must have a system. To start that system, we must be prepared, so I have chosen for my text "Preparedness," and all of my remarks and suggestions will be along that line, with the hope that something may be developed which will add to the system and efficiency of the inside workings of our society.

Seventeen years ago I borrowed the money to attend my first dental meeting, and at that time joined the Michigan State Dental Society. Since that time I have been intensely interested in Society affairs and for the past nine years have been active in *your* affairs. In that time I have formulated some ideas by which it seems to me our society could be benefited, by preparing men for officers and by formulating something to help them to be proficient. Your car may have a good name and its lines and finish may be above reproach, but if any part of its working machinery is not doing its function, its usefulness is greatly impaired. So it is with our State Society. We have a good name and an enviable one, but when our District Societies *slump*, the effects are felt throughout the State Society, and its efficiency is impaired.

As your president, I have tried to attend a meeting of each district, but as some districts have failed to hold their meetings it has been impossible to get in touch with their members.

The meetings were fairly well attended but in every case the attendance should have been doubled. My only criticism regarding the majority of these meetings is that they depend too much upon outside talent, allowing much desirable material to lie dormant. The program of the Sixth District Meeting which I attended was made up entirely from its members, and I believe this did more for its district than any program I have heard.

Now what can the State Society do for the District Societies? I have three things to suggest: First, that the members who have made the meetings of their districts a success, and claim they have had their day and done their share, take off their coats and do a little work to build up the abundance of material which is at their disposal; that they take their places and leave their coats off until they have succeeded. Second, that the State Society should call a meeting of all presidents and secretaries of the District Societies to meet with the officers of the State Society sometime during the annual meeting, for the interchange of ideas, and to report successes and failures, etc. In this manner the state officers would be able to meet the district officers in a different way, and be able to grant the help required. I have taken the liberty of calling such a meeting this year, and last night held a meeting with twenty-two men in attendance.

The council feels that it was a success and of much benefit to the district officers and that much good will result. My third suggestion will appear under another head.

In this connection I should like to make a personal plea to the members of the District Societies to use more thought in the election of their officers. There is not a year that goes by, that some district does not elect an officer merely because he is a good fellow, or because he has never held an office. His failure to make good is not only a hindrance to his society, but stops its momentum. and when a new officer is elected to fill his place, it takes considerable time for him to get started.

The same carelessness is shown in the way members are nominated for the consideration of the Governor in his appointment of a member to the State Board of Dental Examiners. Men are nominated without thought of their qualifications, and men who could not and would not accept the honor if tendered them.

The District Societies should hold their election of officers at a more uniform time. As it is now, officers are elected at different times in each district, which makes it impossible for the State Secretary and the District Secretaries to work in unison.

As past presidents have stated, no man should be elected to an office of the State Society until he has proved his worth to his district. The importance of this is realized by every member of the Council, and should be considered seriously by you in the selection of your officers. As your secretary three years ago I was inefficient, and not until my third attempt did I feel that I was qualified to fulfil the duties of the office. At the beginning of my third year I commenced a list of the duties of a secretary as I saw them. This list I turned over to your secretary, hoping that it would help him to become more proficient, and requested that he add to it as he saw fit. I hoped in this way to lessen the burdens of future secretaries and to give them a clearer idea of their duties, and to prepare the society with more able officers. No one but a president who has been a secretary, realizes the amount of work the secretary does, and just what a good secretary means to a president, and to the success of your society. I wish at this time to thank the executive council for my secretary and hope that the next president will have such help. A good secretary and a good treasurer should be retained as long as they will serve. As your president I have also taken the liberty of preparing a list of the duties of a president, hoping that they will be accepted in the light intended, and that this list will be added to and passed along and be of some help to future presidents.

During the last four years since the duties of your officers and council have been changed so much, I have heard each year at our first council meeting a remark of this nature, "Wish we had so and so, our last president, here." Not that I have any hope that such a remark will be made this year, but to prepare the council for the help which it needs in the future, I wish to make this suggestion, that my successor and future presidents be retained on the council for one year as ex-officio members.

The American Medical Association have a president-elect, who serves as an under-study for one year. This, I believe, is far from being equal to having an ex-president on your council. Your president is generally elected from the council, and I think always should be. He has had more experience after serving as president than any other member of the council, and certainly at that time is in closer touch with the District Societies than anyone else. He has made suggestions which have been approved and referred to the council and he would be of unlimited help to the incoming president and executive council.

If I am not assuming too much I should like to outline some of the duties which I should expect from such a member on your council in order to help the efficiency of the State and District Societies: First, to call a meeting of all officers of the District Societies; second, to visit the District Societies during the year at the society's expense, to render necessary help; this, I believe, would materially strengthen the District Societies if done systematically and is my third suggestion referred to under Help to District Societies; third, to bring forth the suggestions of past presidents and suggestions from other organizations, which would seem applicable to our society, and to submit them to the council for its consideration. The last duty, I believe, would be of unlimited value to your council and to the future of your society. As it is today, your presidents, after spending a number of years in service, present suggestions for the future success of the society, and these suggestions are referred to a committee. This committee is very often unfamiliar with society affairs and has but a short time to prepare its report. As a sample of such a report I quote, "Your committee begs to report that the president's address is of such a complex nature, that we have been unable, in the brief time allotted to us, to formulate a plan, but would recommend these suggestions to the council." They are buried with the author's remains.

I was much chagrined in re-reading your past president's addresses to see the number of valuable suggestions that had never been acted upon. I was surprised to note the same thought suggested in another way which had been alluded to years before, showing that past presidents' suggestions had never been acted upon and that each incoming president was obliged to formulate new plans, instead of being able to profit by the experiences of others and continuing their work.

Just as it is necessary to develop men in districts for state offices, should District Societies give more thought towards developing its young men. Beginning next year our college courses will be lengthened to four years. This means that every new man to enter our ranks will be better equipped than we were and better prepared intellectually to present something to our societies. Make our societies of interest to him and push him along. We need the young men. The First District has done more for its young men by organizing the Clinic Club than anything that has ever been done in the state. I predict that the members of the Clinic Club will be much sought after for State and National Meetings.

A year ago many clinicians failed to appear at the annual meeting after succeeding in getting their names on the program; therefore I hope the council will continue its policy already advanced, and see that invitations are not extended to such men in the future.

We have men who are wanted throughout the world, and I should like to see a meeting within the near future, made up entirely from the material within the state. I hope that I may live to attend such a meeting, and one where the manufacturing exhibitors, having been allotted from one to two full days, will close absolutely during our sessions.

In order to curtail the expenses of the council for the past number of years, but one council meeting has been held and that in the fall of the year. This, I believe, is a penny-wise and pound-foolish custom. I am convinced that it is policy to hold two meetings every year, the first as early as possible after the inauguration of the new officers. This is necessary so that the council may formulate some idea of the idiosyncrasies of its president, early in his administration. At the first meeting, plans for the next annual meeting could be discussed informally. In this way each member of the council begins to work and think along individual lines in regard to the annual meeting, and many well developed ideas will have matured before the fall council meeting. This year a June meeting was held and I am sure that it had its bearing upon the program before you, and was largely responsible for its being in your hands one full month before our meeting.

This program was not prepared for those who attend meetings simply for a vacation or to be entertained, but to give those with lofty ambitions a chance to assimilate many things of exceptional value, and to send them home better qualified to fulfil the trust given them.

Today we are to be honored by papers from our ex-presidents and it seems to me that today is the time to look forward to the continuance of their help and knowledge gained by experience. I should suggest that the outgoing president each year take it upon himself to call a meeting of some kind during our annual session to which all ex-presidents would be eligible. The object of such a meeting would be to get suggestions which would be of help to the incoming council and present these in writing.

There is not a profession which is donating so much time and energy to the consideration of education as ours. The oral hygiene movement is coming with a stronger demand from the public, and this is entitled to our support. Especially is this true in the smaller towns throughout the state. Though I have never been entirely in sympathy with the use of the daily press in connection with this work, I should like to compliment the Kalamazoo Dental Society for their efforts in enlightening the public through the press. I believe they are really reaching the public in a way which must prove to be beneficial. I have been assured that material and help will gladly be given to any other society that wishes them.

Acting upon the suggestion of your last president, the council this year entered in good faith into a contract with the *Michigan Dental Journal* to supply our members with a magazine practically our own. It was the hope that such a contract would place the papers, discussions, clinics and proceedings of State and District Societies into your hands much sooner than heretofore. It was also hoped that such a magazine would have a tendency to stimulate more interest in District Societies by informing them of the activities in other districts. Furthermore, that it would be a desirable medium for conveying messages of importance directly to our members. This contract was made for one year and the council asks you to be lenient with your criticisms until the editors who have put both heart and soul into this attempt have had a chance to prove it a success. Bear in mind that the editors of the *Michigan Dental Journal* are busy men and all donating their services to this cause. Too much praise cannot be given them for their laudable undertaking.

I am thoroughly a believer in honoring the living when possible, and hope that you may see fit at this session to show the appreciation of the Michigan State Dental Society to Thomas A. Forsyth by a small contribution for a loving cup to be presented to him by our profession.

The trustees of the Research Institute of the National Dental Association report that over $22,000 of the $50,000 required for the purchase of the property to be used as headquarters for the research work has been raised. They are asking the different State Societies to contribute toward this fund. This is indeed a worthy cause, the results of which have already been demonstrated. I trust at this meeting you will ask the council to contribute as much as our treasury will permit.

Although it is too late to honor Dr. G. V. Black, who has passed away since our last meeting, may we, in order to show our love and esteem for one to whom we owe so much, pause in this session for a few moments?

As for this meeting, I wish to express my thanks to all who have helped make it the success it surely will have—to the ex-presidents who have willingly contributed, to our distinguished guests who will present able papers, to the Clinic Club and its directors who have given much time and thought to their new organization, to the exhibitors, and to the different committees having the meeting in charge. To your committee the credit is all due, "so give praise to those to whom praise is due."

Knowing what is before you, I cannot refrain at this time from being so personal as to mention the name of one whose mind first conceived the idea of the "Clinic Club," which will mean so much to our society in the future. It is of the greatest pleasure for me, in the name of the Michigan State Dental Society, to thank Dr. O. W. White.

I wish to thank the members of the Executive Council for their faithfulness, willingness and cooperation, for courtesies extended me and for their patience with, and consideration of my feeble efforts.

To you, members of the Michigan State Dental Society, to whom I owe so much, I cannot hope to express my appreciation. I was more than pleased to serve you upon the council. In acting three years as secretary I was highly honored, and when you elected me president, having never contributed anything of a scientific nature, and having never accomplished anything of particular merit which would justify me to hope for the greatest honor at your hand, my cup of joy was full. Today, after serving you to the best of my ability, my heart is full of sorrow in leaving your service. Never have I enjoyed any work so much and it is with feelings of regret that I realize my close relationship with you is severed. The association with many big hearted, broad-minded men from different states and from all over Michigan has been invaluable to me.

My message to you is finished and soon will be stored in the archives of our society, as an effort of mine to help the society of the future. As for myself, I prefer not to have an honorable discharge but to be placed again in the rank and file to begin anew where you will always find me willing to do anything within my power for the good of our society and profession. Remember, it is my misfortune to follow directly Drs. M. L. Ward, W. A. Giffen and C. A. Burbridge—men who have given prominence to our society since joining the National. I cannot hope that you place me in the same company with them, but make me a private somewhere near them and be

"To my faults a little blind,
To my virtues very kind."

New Orleans Wants 1918 Meeting

New Orleans wants the honor of entertaining the 1918 convention of the National Dental Association and allied societies and organizations. This unanimous desire was expressed at a meeting of the First and Second District Dental Society. Cooperation of the Convention and Tourist Bureau of the Association of Commerce has been obtained, and a nation-wide campaign to bring the dentists to the Crescent City in 1918, has been launched.

At the enthusiastic meeting of New Orleans dentists, a special committee named at a previous meeting, reported upon the advisability of going after the national convention for 1918. The committee, after having gone fully into the matter, approved the plan of going after the big gathering. It was agreed to send a formidable delegation to the Louisville meeting in July, and the invitation and claims of the Southern metropolis will be presented in a clear, convincing manner.

A special committee was selected to develop the state and national interest in New Orleans and was well received. Dr. J. P. Wahl was named chairman of the committee, and he will be assisted by Drs. J. Rollo Knapp and Paul de Verges.

Dr. Wahl and his committee have gone to work. They intend making every day between now, and the Louisville meeting count. Every member of the national body will be communicated with, and one of the most systematic campaigns ever attempted will be waged by the Orleanians. New Orleans and Louisiana stand behind the dentists in their commendable desire to entertain their professional brothers in 1918, and it is believed success will crown their efforts.

AFTER-DINNER SPEECHES, OHIO STATE DENTAL SOCIETY BANQUET, DECEMBER, 1915.

Dr. E. C. Mills, *Toastmaster*: Ladies, honored guests and members of the Ohio State Dental Society.

Your presence on this occasion seems to me a fitting climax to the Golden Anniversary of our State Society, having with us so many distinguished personages who have become known throughout the dental world by their contributions to the science and literature of our profession. Looking down the long vista of years since the organization of this society, we see emblazoned many notable names which our State has given to the profession, and many names of those here tonight will also stand the test of time, and take their places in its history.

In my position as toastmaster here, I am different from the small boy who was sent out to dig potatoes, and who, after futile attempts called to his mother—"Say, can't Jimmy dig these potatoes? He knows just where to find 'em,—he planted 'em." The fact is I don't have to dig to find 'em, and they are neither small nor few in the hill. My difficulty is in choosing from so many.

A few years since, it became known throughout the profession that eighty per cent. of the dentists of Indiana were members of the Indiana State Dental Society, and investigation established the fact that this condition was largely due to the efforts of one man—one of those quiet, earnest workers whose ability became known beyond the confines of his own state, and he was recognized as the one person upon whose shoulders should rest the great responsibility of advancing the interests and purposes of the National Dental Association. Few dentists knew of Huntington, Indiana, before they knew of the man who placed it on the map. I take great pleasure in introducing Dr. Otto U. King, Secretary of the National Dental Association.

Dr. King: Mr. Toastmaster, ladies and gentlemen:

I consider myself highly honored to be introduced to such a fine body of wide-awake dentists. I do not say this in any spirit of flattery, but for your encouragement. I have the opportunity of visiting a great many dental societies, but it has never been my privilege to attend a state meeting where the attendance was as large and the interest so great as you have manifested in this meeting. It is an inspiration to look into your faces and realize that through your magnanimous spirit you have been making history during the last few hours that will establish a new precedent and high-water mark for other state associations.

In the beautiful spirit of brotherly love and appreciation you have shown in your practical gift of the X-ray outfit to Dr. Callahan, you have said to all the dental profession, not only in Ohio but everywhere, that you do not wait until the end of a life to bestow your appreciation and love of a man's scientific service to humanity. Ah yes! this magnanimous spirit manifested here tonight will live long after many of us have passed away and be an example and an incentive for generations yet unborn to bestow upon their professional brothers, who labor unselfishly for the betterment of the profession and humanity, their flowers of love and appreciation while they are living.

The fine testimonial to Dr. Price and the work to which he has dedicated his life viz.: the Research Institute, has received a new impetus in that most excellent gift of four thousand dollars from the Ohio State Dental Society today. You have placed yourselves on a high pinnacle of unselfish love and appreciation in these two magnanimous gifts to your untiring scientific investigators. Well you may be proud of these two men, for everywhere in the dental profession we have accorded to these men a high place in our esteem and appreciation of their work and unselfish devotion to a great cause. It has been said that a man is not without honor save in his own country. However, in your society, the reverse is true. Such an example as this will encourage every other state dental society to give to its worthy men due recognition, and bestow upon them honor and appreciation while they are still living.

WHAT OF THE FUTURE?

While listening to Dr. Price's presentation of this X-ray outfit to Dr. Callahan, I have been wondering, "What of the future?" While at San Francisco, we received a telegram announcing the death of Dr. G. V. Black, and we were all grieved and saddened when we realized that the dental profession had lost its greatest scientific dentist. I remember the time when I asked him how he was able to accomplish such a tremendous amount of definite work in so many different fields of dentistry. You know Dr. Black was not only a great bacteriologist and pathologist, but he was a man of versatile talent, a finished, educated man in every field and phase of dentistry. It is simply amazing and marvelous for any human brain to be able to accomplish what Dr. Black consummated in a single life-time. He was undoubtedly head and shoulders above any other man in the history of the dental profession.

Dr. Black in answering this question said: "When I began the practice of dentistry, from the very first day I opened my office, I went to it one hour earlier in the morning than my office hours. I locked the door and started a definite program of spending one hour on a definite subject. This policy I pursued until the one hour's time was entirely too short, and I increased the time, spending day and night in my research work. Yes, I became so absorbed in my scientific investigations and work that it became the consuming desire of my life to establish scientific truths and practical results in dentistry." Thus, you see the price that Dr. Black had to pay in order to write our text books and give to us scientific truths relative to alloys, gold, classification of instruments, bacteriology and pathology, and the many other departments of dental work, in which he gave his untiring energy and devotion and accomplished something worth while, not only for the present but for the future of dentistry.

It has been only a few hours since Dr. Brophy, one of your honored guests here tonight, informed me that in the preparation of his great book on "Oral Surgery" he had spent three years of his life, and never left his office until the midnight hour, with the exception of three nights during all that time. Is it any wonder that Dr. Brophy is known all over the world as an authority on oral surgery, and especially on cleft-palate work? It is this untiring devotion and self-sacrificing spirit that he has manifested during all these years that places him today at the head of his specialty.

You also have with you tonight another honored guest who was the orator today at the dedication of the Miller Memorial Monument. I refer to Dr. Edward C. Kirk. Dr. Kirk is known in dentistry as the Dean of Editors, and a man who stands pre-eminently in the forefront of the educators in our profession. All of these distinguished men have had to pay a great price, in hard work, to reach such a pinnacle in their various fields of labor.

A BETTER INDIVIDUAL DENTIST

The busiest job facing any man is—himself. Every dentist should develop his own individuality and originality, if he ever expects to reach a high plane of usefulness to humanity. I already know that the Ohio State Dental Society has produced great men in dentistry, and also in other fields of endeavor; but what of the future? Has there not been too much of a tendency to develop in our state societies a membership of "leaners?" Some one has said, "All the world cries, 'Where is the man who will save us? We want a man.' " Don't look so far for this man. You have him at home. This man—it is you, it is I; it is each one of us. Over the door of every profession, every occupation, the world has a standing advertisement: "Wanted—A Better Man." While coming to your city yesterday, it seemed to me while riding in the train that in every town we went through that I could see this significant sign: "Wanted—A Better Individual Dentist."

Why should Ohio not produce great scientific dentists; great dental surgeons; great editors; and thus raise the standard higher and higher from year to year? This aim is not hitching your wagon to an impossible star.

BE A STUDENT

I trust you will pardon a personal reference, but it illustrates a point I want to discuss. A few days ago while walking down the street with my son, he said to me "Papa, just across the street there, in that second-hand store, is a cage of little puppies. Let's go over and see them."

So following his suggestion we walked across the street and for several minutes stood there and enjoyed the pranks and frolics and antics of those little puppies, for they were a dream in appearance, and one was loath to leave them without fondling them. While standing there and becoming absorbed in the pleasure of watching these pups, the proprietor came out and said "Well, beautiful puppies, aren't they?" To which of course we gave our enthusiastic assent. He continued by saying "A veterinary surgeon just passed along here and told me that he could give these little puppies a hypodermic injection and that they would never grow or develop, but would always remain puppies."

After I had left him and started up the street, I thought of the many dentists that I had known, who on the day of graduation from their various schools of learning, evidently received a hypodermic, and they have never grown from that day to this, but have remained simply puppies in the dental profession. (Applause and laughter.)

I would like to have each one of you remember it is not the dramatic moments of life that count. It is the quiet planning and the reading of the man who is getting ready now for what is going to happen two, five or ten years from now. I wish I could impress upon every man in our profession this fact, that mental stagnation is sure to halt a man's progress. Mere momentum will not carry him far. When he is satisfied with himself and stops growing, he also stops moving. The ablest dentists are *constant* students. The dental profession must be so organized that it will create and develop in the breast of every member an eagerness and desire to keep on learning more about his profession and its great aims.

The world wants steady-headed men; men whose feet stand on the ground; men who can see straight through a proposition and secure scientific results. The world needs more writers like Dickens and Hugo. There are beckoning opportunities for more lawyers like Lincoln; more statesmen like Jefferson; more preachers like Beecher; for more painstaking men like Edison and Burbank, and more scientific dentists like Miller and Black.

I have learned a great lesson from my dog Charlie. Now, Charlie is one of those dogs that is so homely that he is really beautiful. You have seen dogs probably like Charlie. Charlie has prognathism of the lower jaw. I think he belongs to the third class. Charlie has also a hare-lip. Charlie is a very sympathetic and knowing dog. He laughs with his tail and cries with his tongue. I want you to be sure and remember this about Charlie, that he has a bull-dog tenacity, for which his breed is known, and he has this characteristic so well developed that when one of the neighbor's dogs appears on our lawn, and Charlie engages him in a fight, the neighbor never thinks of running over after his dog, but he always brings his spade, because he knows the results.

Ah yes! I want you to get this lesson, that we have too many dentists that are failing to develop their own initiative and originality. Too many are doing things in the same, old way as taught them by their grandmothers or their grandfathers. Let's develop an enthusiasm for our professional work, with a determination to do things to a finish. Let it never be said of any of us that we are a "cheap John" or fail to fill root canals, or do any other part of our work in a slipshod, haphazard manner. We must have a program or a definite plan in each year's work. Then, at the close of the year, we may be able to stop and take stock, so to speak, of our dental growth during the year.

I want again to thank you for the many courtesies and the hospitality shown to me during this meeting, and on behalf of the officers of the N. D. A., I want to extend to each one of you a special invitation not only to come yourself but to bring your wife or sweetheart with you, to attend the great National meeting that will be held in Louisville, Kentucky, July 25th to 28th, 1916.

I would like to ask each one of you in closing, this question: When humanity is so in need of dental services, CAN IT DEPEND ON YOU?

Then, let us ever remember

"Power, intellect and health
May not, cannot last:
The mill will never grind again
With the water that is passed."

I thank you. (Applause)

TOASTMASTER: The one great problem of the ages solved by Dr. W. D. Miller is the scientific exlpanation of the process of dental caries. We have with us a scientific author and editor. As a scientist, his investigations are supplementary to the work of Dr. Miller, in determining what conditions of environment accelerate, retard or cause a cessation entirely of this pathological process. Research has demonstrated that the fluids of the mouth, especially the saliva, play an important role in the etiology of caries. The conditions of environment being more important than the density of the dental organs in structure, is a most important subject, which, when solved, will enable us to teach prophylactic measures in the strictest meaning of the term. As an author, he has given the profession a text book on Operative Dentistry, which created a new era in our literature—works of composite authorship, where writers of acknowledged authority are selected to give the "last word" in their special field. As an editor, it is unnecessary to comment, except to reiterate the statement heard on every hand, the dental periodical which has the words "Observe, Compare, Reflect, Record" printed on its cover, has created a desire for and supplies the latest in scientific thought and investigation. Editorially, it has been one of the most potent factors in influencing the trend of professional thought and opinion. I take pleasure in presenting Dr. Kirk, Editor of *The Dental Cosmos*.

DR. EDWARD C. KIRK, Philadelphia: Mr. Toastmaster, members of the Ohio State Dental Society, honored guests, ladies and gentlemen:

I assure you I did not recognize myself in the flattering introduction of the Toastmaster, hence, I respond to his call oppressed by a strong feeling of embarrassment, an emotion which is always dangerous to a speaker because it too easily leads to a confusion of thought and expression; hence I fear that my words may become tangled up after the manner of a young preacher who on the occasion of his first sermon misquoted a well known scriptural text by saying, "It is easier for a rich man to go through the knee of an idol than for a camel to enter the Kingdom of Heaven." My embarrassment is considerably increased by the fact that I am compelled by virtue of my present location to speak to a divided audience, separated by the partition between these two rooms. Facing as I do the end of the partition, standing, as it were, on the "Great Divide," I feel as though I were trying to take in a two-ring circus, a feat which I am told by one of my oculist friends can only be satisfactorily done by the unfortunate victim of that visual disorder known as nystagmus. Let me hasten to add that my reference to a two-ring circus is merely by way of analogy and has not the least personal application. (Applause.)

I want to say quite frankly that this meeting of the Ohio State Dental Society has been a revelation to me, not in point of magnitude, for I have attended larger dental meetings; nor even in the features of the excellent program, for other meetings have presented excellent programs; but to me the impressive feature of the meeting has been the enthusiastic scientific spirit that pervades the whole atmosphere of this meeting. It is not only the dominating scientific spirit, but the large and active constituency that gives expression to it that to me is the most interesting and important feature of your meeting.

I am deeply impressed by this revelation of interest in scientific activity because next July it will be twenty-five years since I assumed responsibility for the editorial conduct of a dental periodical upon the cover of which was set forth the assertion that it is "Devoted to the Interests of the Profession." At the outset of my editorial career I felt it to be incumbent upon me to study that problem and to learn, if possible, what those interests are and what we mean when we say "the profession." In the course of my investigations, begun twenty-five years ago, I discovered that there was a wide difference of opinion on the questions involved. It was particularly noticeable that a majority of our colleagues divided dental knowledge into two categories, the "practical" and the "scientific" or "theoretical," the latter being, I presume, by implication at least, impractical.

I came in time to discover that in the minds of many, the "practical" was regarded as something immediately convertible into dollars and cents. Believing the scientific to be the most practical of all things, I concluded that if *The Dental Cosmos* was really to benefit the profession it was necessary to use it as an educational means whereby "the profession" might be taught to change the spelling of that word "cents" to "sense," in which case the dollars would take care of themselves. It also seemed clear that there could be no such thing as "the profession" until the scientific spirit became the controlling motive in the craft to which we belong. In the evolution of time that thing has happened, and today in view of the advances which we have made and, above all, by the shedding of our old swaddling clothes of craftsmanship and commercialism, we have achieved that status and dignity by reason of our service to humanity, and the scientific spirit in which the service is rendered, which today warrants us in applying to our calling the phrase "the profession."

I came to this meeting because I was asked to come and say something on the occasion of this magnificent testimonial to my old and very dear friend, W. D. Miller. We were comrades together; I knew him intimately. Your invitation to come to this meeting was more than a request; to me it was a command. When I got here I found what seemed to me to be the spirit of Miller embodied in the activities of the individuals composing the membership of this society, and I say frankly to you, that never upon any occasion, at any dental meeting I ever have attended anywhere, have I met such a wave of enthusiasm for those things which are for the scientific uplift of dentistry as I have met at this meeting. I am overwhelmed with that feeling. I am celebrating with you tonight my fifty-ninth birthday, but I go back with my youth renewed, and I want to thank you, one and all, for letting me come here to light my torch, as it were, at the altar fire of this society. I feel as though I could reverently say tonight for our beloved profession in the words of Simeon of old, "Now, let thy servant depart in peace, for mine eyes have seen thy salvation." (Applause.)

TOASTMASTER: The exceptionally good program of our meeting has been contributed by men who have made great sacrifice of time and unusual effort to be with us, efforts so strenuous that I am reminded of Pat's first ride in a Pullman, where he had an upper berth. After much noise and bumping about overhead, the man below called out—"What's the matter up there?" No response, but the thumping and bumping continued, and again the man below asked what the trouble was—when Pat sang out—"Be jabers I've had a terrible time gettin' into this hammock—but I'm in!" So, in spite of much trouble and effort—some are "in" tonight who had expected to be "off again." One of our essayists in accepting the invitation from our program committee, desired a place on the program where he could conveniently present his paper between an incoming and an outgoing train, so eager was he to return to his practice. Thirty-six hours have passed since his paper was read, and we are pleased to note his change of mind and heart, and his presence still with us. His paper was one of the most scientific and exhaustive on the subject of Silicates that ever has been presented, and when published will afford much valuable material for thought and study. I feel that I voice the sentiments of our entire membership in expressing a feeling of gratitude to this man, not only for his scholarly paper, but for the inspiration his presence and interest in the success of this meeting has given us. It is my pleasure to introduce Dr. C. C. Voelker, of Brooklyn.

DR. C. C. VOELKER, Brooklyn, N. Y.: Mr. Toastmaster, ladies and gentlemen, guests of the Dental Profession of the State of Ohio:

I always have a feeling of sympathy for my hearers when I am called upon to speak at post-prandial occasions, such as that which probably animated the mayor in the anecdote that is related of the Honorable Joseph Chamberlain. Mr. Chamberlain was the guest of honor at a dinner in a small town outside of London one evening, at which the mayor of the town acted as toastmaster; and after the eating was about finished and while the coffee and cigars were being passed, the toastmaster turned to Mr. Chamberlain and whispered; "Shall we let the people enjoy themselves a little longer or had we better have your speech now?" (Laughter.)

First of all, ladies and gentlemen, I want to congratulate you upon the success and high scientific plane of this your Golden Jubilee Convention. It has been a revelation and an inspiration to me, and a proof of what you dentists of the center of our great country are doing for the development of dental science and of dental art. As I said when I read over your program and noted the little words of wisdom such as this: "If you know it all, we need you;" "If you don't know it all, you need us," which your program committee had printed on the bottom of every page, I remarked involuntarily, "The dentists of Ohio are 'live wires;' they get things done by the spirit of enthusiasm, by teamwork and by the loyalty exhibited by the many component societies composing the State Society, which is bound to win and to do big things."

As I look back along the short vista of the past ten years since my graduation from the University of Pennsylvania, I realize what remarkable advances dentistry has made even in that short period towards the fulfillment of that ideal of preventive medicine which the great Robert Ingersoll undoubtedly had in mind when he said: "I see a race without disease of flesh and brain, shapely and fair, the married harmony of form and function; and as I look, life lengthens, joy deepens, love canopies the earth, and over all, in the great dome, shines the eternal star of human Hope." We have only to note the improvements in the porcelain inlay, in the casting methods for gold inlays, the remarkable advance in the silicate cements and in methods for the treatment of the root canals of teeth, the introduction of the X-ray as an office adjunct of daily use; and above all the realization that prophylaxis, that preventive dentistry, is the watchword of twentieth-century practice—Prevention, Prophylaxis, those words that should be written high on the walls of every temple erected to Aesculapius, passwords to the inner shrine of the temple of the goddess Hygeia.

We stand forever on the boundary between the known and the unknown, ever widening our horizon of knowledge based on fact, ever pushing into those uncharted expanses of the mysterious, veiled by the God of Nature until man's mind shall become sufficiently developed to comprehend His ways. If we pass in review the long and arduous course of human evolution, he would be an intrepid man who would be willing to say that it is now at an end or that it has reached its highest estate. The race is ever evolving, and with it also the individual, enlarging his capabilities and ever fulfilling the potentialities inherent in his will as the heir of all the ages past.

We are to be congratulated that as a profession we are practicing in an age when scientific research is being extended to every department of human activity. It was Hazlitt who said: "One truth discovered is immortal, and entitles its author to be so; for, like a new element in nature, it cannot be destroyed." A life like that of Willoughby D. Miller is not to be measured in terms of wealth or honors, however much of honor it was his right to receive from learned bodies and from the great of the earth; its lesson lies in the inspiration it offers to others to take up the work thus far so nobly carried on. The men who, like Dr. Price here with us, are devoting their lives to the search for new truths, are the modern saviors of humanity. They lead the vanguard of human thought in the battle against ignorance and superstition. They crystallize in the alembic of the brain, in the crucible of the laboratory, the modern philosopher's stone, the bright diamonds of pure truth.

The man of science takes as his guiding star the truth, untarnished and immutable. His position was so beautifully expressed by a great French scholar that I should like to repeat it in closing my remarks. During the siege of Paris by the Germans, in 1870, the great French savant, Gaston Paris, gave his opening lecture at the first semester of the University of Paris, as usual, and in defining very clearly the only position that it was possible for the man of science to assume, he said: "Science must recognize as its goal the truth—truth for its own sake alone, without care whether, in practice, this truth may have consequences good or ill, gratifying or regrettable. Whoever permits himself the slightest suppression, the smallest alteration of the facts which are the objects of his research, that man is not worthy to hold his place in the great laboratory in which honor is a far more indispensable title than skill. If in all civilized lands common subjects of study be so conceived and so prosecuted, then will they constitute a great common fatherland, stained by no war, menaced by no conqueror, and wherein human minds shall find that refuge and that union which were offered in other days by the *Civitas Dei.*" (Applause.)

TOASTMASTER: The gentleman I am about to introduce, made a trip to Dresden in 1907. One of the purposes of his trip was to operate on a child with a double cleft palate and a double harelip. He examined the patient, and found that a single operation would overtax the strength of this little child, so he decided to perform half the operation and return the next year to complete the work. He did that, although his trip the second year was a trip needed to recuperate failing health. He performed this operation, and after that, other children were brought by their parents; they were operated on, and others were brought; he worked during the entire day and the nurses fed him broth to sustain him. The next morning he was to leave for Carlsbad. Before he had time to leave the hotel, other parents having learned of his fame, came from afar and brought their children for this master to administer to. Did selfishness prevail? No, it has never prevailed in this man; selfishness is not in his character. A couple of years ago the profession, not only in the United States, but of the world, came to Chicago to pay tribute to Dr. Brophy for his eminent contribution, not only to dental surgery or oral surgery, but for the magnificent contributions he has made to dental literature and to whatever field of endeavor his active mind has entered upon. It is an honor to introduce Dr. Truman W. Brophy, of Chicago.

Dr. Truman W. Brophy, Chicago: Mr. President, ladies and gentlemen:

After such an introduction you would naturally expect me to speak in a most interesting manner. The very kind words of your president and the manner in which he has uttered them have rather disturbed my equilibrium. What I have been thinking about to say has in a great measure been dispelled. While Dr. Kirk was explaining to you something of his career as a practitioner and editor, the thought occurred to me, isn't it well that we haven't all the same trend of mind? If we had, Dr. Kirk would be a surgeon, or I would be an editor. I am sure if I would undertake to be an editor, that my efforts would be very disappointing. I think, however, that Dr. Kirk's capacity as a professional man would make it possible for him to be a great surgeon. Again, the thought came to me while he was speaking of the wonderful achievements of this society, is it not possible that Atkinson was right when he said with such emphasis and characteristic enthusiasm, "It is the spirit that prompts us to achieve more than the ordinary;" and may it not be that this spirit of Atkinson and of Taft and the lovable George Watt may be among you? Is it not possible that the lives of these men have not passed, that their spirits live among us? And may it not be possible that Atkinson was right when he said, "We shall live and our influence shall be felt"? I believe he was right. There is something more here than the efforts of individuals; there is something behind it all that is urging us on, something that is unseen, that is the spirit that surrounds us and leads us on to greater things, so much so that the profession is advancing at a rate beyond the comprehension of those who have given it the greatest thought. In the city of Boston only a few weeks ago at the great meeting of the Surgical Congress of North America, Dr. Charles Mayo made the statement that the longevity of the people of the city of Boston would be greater by reason of the founding and of the carrying on of the work that is in progress in the Forsythe Dental Institute. Charles Mayo said that the greatest progress had been made in preventive medicine in the last decade by reason of the work of the men engaged in the practice of dentistry—men who are doing much in research work, making it plain that the infections before the physician are of dental origin in many instances, and that in acquiring a knowledge of these infections the physicians would be able to meet the diseases that are making terrible ravages and destroying the lives of the people. If it is true that the people of Boston attain a greater age by reason of the Forsythe Institute, isn't it true that in the state of Ohio, where a great institute surely will be founded, the people of this state, too, will live to a greater age, in a better state of health, in greater comfort than they ever have lived before? I spoke to your president a moment ago, and said, "It seems to me, if I say anything, it had better be about the present status of dental education in our country, just a word, and sit down."

What is the present status of dental education in our country? Our president tells me the state of Ohio has enacted a law making it obligatory upon all the colleges to require graduation from accredited high schools as a requirement for admission. Such a rule prevails today under the rules of the Faculty Association; every faculty holding membership in that association must require high-school graduation of candidates for admission to those schools. There is a danger that much that is being done in advancing the cause of dental education may fail to reach the highest ends. Our late friend, Dr. W. C. Barrett, of Buffalo, told of a man thirty-two years old. who came to them to study dentistry. He was a proficient scholar, acquainted thoroughly with French, German, Italian, Spanish and English, a man who had passed his course in a European University and had taken high honors as a scholar. After four months' study it was found that he was incompetent, that he could not do anything with his fingers; he was clumsy, and Barrett declared that "this man had the best trained mind and the most ignorant hand of any student who had ever entered the institution." We have this danger confronting us. Let the student be trained in letters, but let him also be trained digitally, so that when he goes out into practice, he will not be a book-trained, college-trained dental bungler. (Applause.) Let the teachings of your association in digital manipulation be such that he will not only be a scholarly dentist, but he will be a skilful dentist. Someone said some years ago in speaking of science and art and of the development of our profession in the last decade: "Oh, Science, thou art so fickle, but Art, Art is with us forever." Now, true science is not fickle, but that which is called science is often, in the light of further investigations, and in the light of the truth, found to be error.

Oral surgery is not taught in the schools of medicine. I hope it may be. You do not have the surgeons teaching dental pathology to medical students, and that is the reason so many mistakes are made.

This has been a wonderful meeting, and the most wonderful part of it has been the good fellowship manifested on all sides. When each one goes to his home and relates to his fellow practitioner what happened, next year the meeting will be more largely attended than ever. I thank you. (Applause.)

TOASTMASTER: The great State of Illinois has for a number of years been the model State in point of perfect dental organization; more than this, it has been the seat of dental thought and activity of the Middle West, to a marked degree. That eminent dental scientist, Dr. G. V. Black, whose recent death is mourned by the entire profession, left an enduring monument in his contributions to dental literature. Further, it was his pleasure to see his great principles of technic so universally adopted that, to the dental mind, Chicago and Extension for Prevention were synonymous terms. We have with us an exponent of all the great and good things that have been given us from Chicago; one who has the power of oratory—not only to proclaim the principles with which he is imbued, but to drive home those facts with such convincing force and logic as to banish any question of doubt from the most conservative mind. The partial partition between these two rooms, so happily alluded to as the "Great Divide" by Dr. Kirk, would have no terrors for this man were the partition complete, as I am advised that his voice has been tested and found capable of carrying through a two-foot wall. We will next hear from Dr. Don M. Gallie, of Chicago, ex-president of the National Dental Association.

DR. DON M. GALLIE, Chicago: Mr. Toastmaster, ladies and gentlemen:

Ever since I have been interested in the literature and history of dentistry, I have been reminded of the great work the dentists of Ohio have been doing. For a number of years I heard of your activities here, but I want to assure you that I had no idea there was such teamwork, such an excellent organization of the dentists of this state as I have seen at this meeting. We in Illinois have heard of the support and generosity of the dentists of Ohio, how they stand first in the support of the work which is going to solve the problems that are facing us, and we felt that you had done more than your share; we were further startled a few days ago by receiving information that the Research Commission had purchased a magnificent home for the research institute, and the dentists of that city where the chairman lives gave him the greatest support by contributing liberally to the purchase of this home. Then when we got here, we heard of the $4,000 you had given, and that seemed the climax to that great spirit, and last this contribution to your old warhorse, the man always found pushing and boosting, and never holding back, John Callahan, of Cincinnati. (Applause.)

I never attended a meeting where there seemed greater desire to get everything it was possible to get, because every session held here it has been almost impossible to get a seat, unless present before the opening hour. Usually men are interested along one particular line, but you men seem to want to get in touch with every phase of dentistry, and this response to the call from humanity and the medical profession is being heard by the men of the profession of every other state in the Union, and this response to the call is the fitting answer to the question sounded by Mayo, "What are you going to do about it?" I have no fear but that the work will be done, because all over this country the dentists are responding. Dr. King spoke of the breed of canine he has seen in the profession, with their growth stunted, and so on. I don't believe he can find that kind in Ohio. You remind me of a pack of blood-hounds instead, close on the scent for everything that will make you better dentists and of greater benefit to the human race. It is an honor to be here and to speak on this delightful occasion. (Applause.)

Toastmaster: When the present site of the Miller Momorial was suggested to the Alumni Association of the Ohio State University, one of the first expressions of approval came from the gentleman who is representing the State University on this occasion. We welcome him as a friend of Dr. Miller—for the address he gave at our unveiling exercises, and as a member of that great and most important profession, that of a teacher. It is a great pleasure to introduce Professor George W. Knight, Dean of the College of Education of the Ohio State University.

Prof. George W. Knight, Columbus, Ohio: In President Thompson's place, I desire to express to you our extreme gratitude for the honor of having the Miller Memorial placed upon the campus of the State University of this great state. You have also done us the high honor, of holding at least one of your sessions upon our campus. We appreciate as a University that honor in every sense of the word, and shall feel culpably negligent if at any time in the future the great advantage we expect to come from your magnificent memorial does not obtain. And we hope you will give us a resolution of rebuke if at any time you have any reason to regret, because of any neglect on our part, having placed this Memorial upon the campus.

I can remember when the dental school of the University of Michigan was opened; anybody could get in; there were no requisites for admission. The course of study, like the course of study in the medical college there at that time was such that almost anybody could get into it and most everybody did in the medical college. The course consisted of two years of six months each, and then the graduates were turned out to learn their profession by practicing.

I happen to represent another profession, and in one sense an older profession. It is just coming into its own as a profession—the business of a teacher. I think of all the professions this profession goes the farthest in turning loose its so-called graduates to experiment upon the children of the community and to learn how to do things at the expense of their patients. The medical profession has been there, the dental profession has been there, but they are far beyond that now. Looking back over twenty-five or thirty years, I think the dental profession, even more perhaps than the medical profession, has reason to congratulate itself on the rapid upward and onward progress that it has made, and the point at which it has now arrived. May I venture to suggest one place at which, looking from my own profession, it seems there is a wide opening not yet fully occupied, a service to humanity, an opening for the dentists of the country, and that is in reaching the students of the state, of the public schools of this and other states, children, the coming generation, not perhaps professionally, but in bringing about an inspection service, an education to prevent disease, in ways helpful not only to the present children, but to succeeding generations. We have about five hundred students training for teaching and supervision work, not as a job, but as a life profession. As a result, the college of education, like similar institutions in other states, comes through its students and its graduates, directly in contact with the people of the state, and I should like to do all I can in cooperation with your society, and if it might be, under the direct suggestion of our training school for teachers, to reach all the school people of this state in behalf of the dental profession, and to suggest the necessity and desirability of a direct and vital connection between your profession and the children in the schools. (Applause.) If in any way we can cooperate to promote the great work you are doing, we shall be delighted to do it. If your society would authorize it at any time, we would be glad to do it, not as propaganda of the dental society, but as propaganda from the training school for teachers. Under those auspices, I believe we could reach every school in this state with such information and such material and circulars as you may think necessary. In that way, we may cooperate with you to upbuild the importance and dignity of your profession and its service in this state. I thank you very much for this opportunity to have spoken. (Applause.)

Toastmaster: Modern research has answered affirmatively for all time, the question of the close relation of dentistry to medicine, and the importance of close co-operation of the two professions in treating many ailments to which flesh is heir. That the medical profession is awake to the pathological conditions that fall within the province of the dentist, is evidenced by the scholarly paper on Pyorrhea presented by a member of that profession, at this meeting. I present an ex-president of the Ohio Medical Association, Dr. J. H. J. Upham, of Columbus.

Dr. J. H. J. Upham, Columbus, Ohio: Mr. Toastmaster: It has given me very great pleasure to be present this evening and to note so strongly in evidence such marked manifestation of the true scientific spirit as has been reflected by the speakers. It is in fact simply the result of the leaven which is working in your profession everywhere, and marvelously so in the State of Ohio.

The spirit is the one thing which characterizes a profession, which differentiates it from a trade, and for the so general and enthusiastic evidence of this spirit in your society, I wish to extend you my heartiest congratulations and to assure you that I consider it a high honor to be on your list of honorary members.

I am glad also to note the closer relations between our respective professions; surely the time is coming when we will work still closer, hand in hand, for the relief of our fellowmen; for only by such cooperation can we take full advantages of the opportunities which science is opening up for us both.

As individuals we are judged by our individual work, but our professions to-day are judged by our efforts collectively, and this includes not only our work in repairing the ravages of disease, but largely, probably chiefly at present, by our efforts for the prevention of disease.

It is a matter of very great congratulation that Ohio is showing so well in the dental line, how you feel this responsibility, and how you are taking steps to meet it; I only hope that my profession will keep abreast, and that together we will be able to accomplish great things for future generations.

I received my first inspirations along this line many years ago, when I had the privilege of hearing Dr. W. D. Miller on one of his visits to this country, I think in 1895. At that time little was said in the line of preventive medicine, as to diseases having their origin in the mouth, and Dr. Miller was away ahead of his time and generation. I was then an interne in Johns Hopkins Hospital when Dr. Miller made an address there that set us all thinking, and from that day to this I have never forgotten his, then startling, suggestions.

I thank you for the honor and privilege of belonging to your society in an honorary way, and I congratulate you and your officials upon this magnificent meeting.

Toastmaster: When Dr. Mayo, in his address at Chicago, called attention of the profession to the importance of scientific investigation relative to systemic infections due to dental lesions, he said that the responsibility devolved upon the dentists to make the necessary research—and asked the question "Will they do it?" There is one man who is taking this question seriously and is making great personal sacrifice in answering this call to service. This man I am pleased to present to you—Dr. Weston A. Price, of Cleveland.

Dr. Weston A. Price, Cleveland: I feel very grateful for the opportunity of being within the influence of the inspiration of this meeting. I rarely ever have had so great a thrill as to see this body of men so united in one purpose, and I have tried to analyze a little in my own mind tonight just what is prevailing in our hearts to cause this unity of purpose. I feel very sure if we could analyze and find wherein we are so united, we would find it to be in the spirit of Dr. Miller, of Dr. Taft, Dr. Watt, Dr. Black, Dr. Brophy, Dr. Callahan, and others, these leaders among us, who have had a star of some kind; and I doubt if you can account for the life of men like Miller, or such men as we have been speaking about, who have given us this inspiration and for their life of continued activity on any human basis. If you look at Dr. Miller's life and see, for example, his devotion to the cause that he was so constantly striving to uphold, you will wonder why a nature so large would not be giving itself incessantly to the devoted wife and family, would not be giving itself to politics, to professional organizations or to something of that kind, but notwithstanding that largeness, through it all we find some unseen controlling power dominating and leading that life up through every obstacle, through every environment, on and on went Miller, ever toward that one goal, and when you analyze to find what it was that led him on—he was powerless in the hold of that great force—we find the answer, I think, in a little incident away back in Galilee when one day, that man from Nazareth was travelling around with his disciples. He seemed to be looking down the centuries, and seeing the time when in one decade after another the great scourging plagues of humanity were being stayed one by one. He turned to the little band of followers, and said: "And ye shall know the truth, and the truth shall make you free." And the Miller that we have been dreaming and thinking about these days, and the Black who has recently gone, and those other past leaders were led on by that force. How they loved the truth! I think that is why we are here today. We love the truth. (Applause.)

Toastmaster: It should be a matter of concern with a presiding officer, that his successor should have the ability to rectify any of his mistakes, and the qualifications to make effective any measures that tend to the good and welfare of the organization. The unanimous vote given to the man of my choice for the office I am about to vacate, leaves no doubt in my mind that he possesses these necessary qualifications and the personality to shape the destinies of this society in a manner that will be sanctioned by our entire membership. I take great pleasure in presenting the newly elected president, Dr. T. I. Way, of Cincinnati.

Dr. T. I. Way, Cincinnati: Mr. Toastmaster, ladies and gentlemen:

While sitting here listening to our distinguished guests and members whose wealth of attainment in the science and art of dentistry has contributed so much to the advancement of our profession, and whose remarks have dealt much with the splendid organization and high efficiency of our society, it has seemed to me that each member present should feel a great gratification in being a part of this splendid organization. During the past three days we have been privileged to enjoy an exceptional program. It might be compared to a well appointed meal. Gentlemen, you have enjoyed the *substantial* and the *dessert* has just been finished. While I might detain you by a few selected stories, as the hour is late I shall simply comply with the request of our toastmaster who has proven so efficient in that capacity as well as an excellent diagnostician in that he diagnosed my limitation so well, when he said "Tom, I want you to give your address the last thing." So it is my pleasure to follow his instructions by giving my address —52 Groton Bldg., Cincinnati.

Others spoke at the banquet briefly as follows: Dr. J. Y. Bassell, Dr. O. W. Burdatts, of Wheeling, W. Va., Senator Erastus Lloyd, Dr. W. T. Farrar, of Louisville, Ky., Dr. G. E. Johnson, of Fort Wayne, Dr. Chas. Swope, of Columbus, Dr. L. P. Bethel, Dr. C. N. Watts, of Des Moines, Iowa, Dr. H. C. Brown.

Rising vote of thanks given to Senator Erastus Lloyd for his work in connection with passage of the new dental law.

CONCLUSION OF BANQUET

Toastmaster: Before adjourning, I wish to take this opportunity to disclaim any credit for this successful meeting now nearing its close. The responsibilities during the year have rested lightly upon my shoulders, owing to the co-operation of the membership and to the efficiency and earnest support given me by the several standing committees. Matters referred to respective committees were attended to with dispatch, and without the conventional plan of having it "under way" for an indefinite time, during which it and other duties could have been attended to. "Speedy action and favorable results" has been the slogan. You are familiar with the work accomplished during the year, and, with my committeemen, we submit it to the membership, with an abiding faith in the justice of your decision as to its merits.

I want at this time to express my personal thanks and appreciation to the Program, Arrangement and Clinic Committees, through the respective chairmen Drs. L. P. Bethel, Harry Cope and A. W. Newell, for their untiring efforts, attended with expense of much valuable time and labor to make this meeting what it has been. Also to Dr. Chas. Swope, who carefully arranged for the banquet we have so fully enjoyed.

I am keenly sensible of the high honor that has been conferred upon me by this society—no doubt the greatest I shall ever receive. My dream has ever been of a greater society, a closer union and better fellowship among the dentists of the state, knowing that through this condition the public would receive better service and dentistry receive the prestige which would cause it to rightly come into its own. What humble service I have rendered to the society has not been wholly from a sense of duty, incumbent by virtue of my office, but has been in part for the pride I have in our profession, and love for the many good men in it. We have a community of interests, and as we meet these duties that devolve upon us as a profession, so we shall be weighed in the minds of the laity.

One of the greatest pleasures I enjoy is that priceless treasure that has come to me during the past few years—the sincere friendships that have been formed. I thank you.

EDUCATION AND ORAL HYGIENE COMMITTEE REPORT*

BY DR. E. W. MARTINDALE, CHAIRMAN, COLUMBUS, OHIO.

Gentlemen: This report is prepared with the humble feeling as in the past, that so little of so stupendous a task had been accomplished that it seemed almost farcical to attempt making one.

Conditions have changed in almost all parts of the state. Now, we find that instead of putting the cart before the horse, and making a stab at the work by having a dental inspection alone, and stopping at that with the barriers up against us, that the people, the school authorities, the officers of the municipality and the district are ever ready to get enlightenment.

Calls are made upon various officers of the State Society, passing by the local man, in some instances—and why? We fear, too often, because there is not a lively interest in this subject by the members of the Component Society and especially by the home dentist.

The educational and publicity work done for us by the State Board of Health in the traveling exhibit, the work done in the legislature and through the Commissioner of Education, has made it much easier for us to get in, and indeed, has come many steps nearer putting the burden where it rightfully belongs—upon the public support, and not on the loyal dentists.

Much has been accomplished in the year just past, blanks have been sent out by our committee to a number of places, and the slides have been pretty busy, also, the three members of the committee have spoken to approximately 60,000 people. Cincinnati, Cleveland and a few other towns have had a special campaign.

A hard, fast rule cannot be laid down for all the localities to adopt, and therefore, we invite suggestions and criticisms from the members of the components. And we believe better work can be accomplished by having a larger committee, composed of one member from each component society, he being the chairman of the local committee.

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*Read at Ohio State Dental Society, 1915.

We have not been extravagant enough to spend all the money so generously allowed us by the board of directors. New slides have been purchased and we have good lanterns, and one moving picture film and lecture forms, all to be had for the asking, and we will expect a greater interest in the coming year than in the past.

REPORT ON DENTAL LIBRARY*

Mr. President and members Ohio State Dental Society: On December 1st, 1914 there were 1497 volumes in the Library of the Society. On December 1st, 1915, by purchase during the past year of 94 volumes, 40 being bound magazines and the rest, text or reference books, we have increased to 1591.

The library has a constant value, not manifested much by a large number of readers, but as a place of reference for those who desire an insight into dental affairs in general as well as special topics. It also represents an ideal situation as a repository of dental literature perhaps not obtainable in any other way than through a large society. Fortunately the first committee appointed by the State Society appreciated the value of duplicates in books and magazines, especially in magazines to such an extent that a large part of the work now done is trading and supplying other libraries in other sections of the country. We especially desire to have all members of the Society know that old magazines, pamphlets or proceedings are very welcome, as we are able to properly store and tabulate them. These old publications are unfortunately too often thrown out as waste paper or burned up. As found in the closets of the average dental office, more or less broken by missing numbers, they present but little value, where, as under the care of proper collection they help to supply missing numbers in libraries in all parts of the country. Requests are continually coming in for certain numbers of certain magazines, or missing proceedings of certain societies, or pamphlets of various kinds. It takes but little time to place such material in boxes and barrels and a card to Dr. Mills or Dr. Semans will bring information as to how we can best receive them.

Respectfully submitted,
H. W. Semans
W. H. Whistlar
C. I. Keeley, *Committee.*

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*Read before the Ohio State Dental Society, 1915.

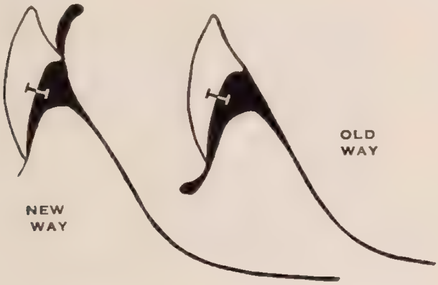
THE PARTIAL PLATE*

BY E. P. DAMERON, D.D.S., ST. LOUIS, MO.

Listen, friends while I relate
The woeful tale of the partial plate.
A "thing of beauty" it should be
A "joy forever" for the friends to see.

It had many curves and curls
And replaces missing pearls;
There were wide gold clasps to hold it in,
Which rubbed the teeth and made them "thin".

But when the teeth are thus worn down,
You have a chance to make a crown.
Thus you see there is no end
To the money one can spend.



The impression first we take,
Then a bite-plate is to make,
So the occlusion we can judge,
But that's darned hard, they always "fudge."

When you think the thing allright
In the flask you bolt it tight,
Or have your "laboratory" do it,
So when it fails—they, not you, will rue it.

Now this flasking is one thing
That much trouble can us bring.
Flasking as this picture shows
Saves much trouble—goodness knows!

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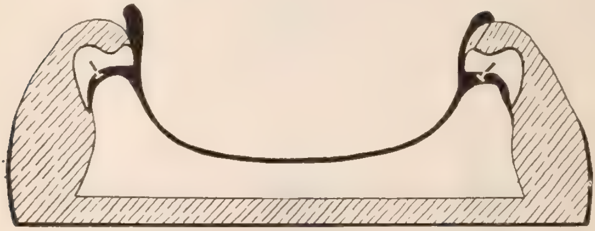
*Read before the St. Louis Society of Dental Science.

Flask model and plate in such a way
When flask is opened, teeth in lower half stay,
The excess rubber then will come
At grinding edge not at the gum.

Now to vulcanize and finish,
Have the plate both strong and "thinnish."
Do not warp it with the brush,
Never polish in a rush.

Never hurry it until
It is time to send the bill.
Then "in high" put on all speed
Ere it fails, the money you will need.



When first inserted its teeth are too long,
Now listen to the burden of my song:—
"Oh, we always make them so,
Better too long than too short you know."

Then we grind them with some heft
'Till of the partial, but a part is left.
And all its teeth are smooth and flat.
Why have those cusps? Pray tell me that!

The sharp projections hurt the gum,
May cause old pyorrhea to come.
But with emetin and scalers as an aid
We can easily cause that thing to "fade."

And we our patients thus delude,
Advocating a diet of "soft food."
Send them away hoping all is well;
Then on "soft bread" they break it—oh, 'ell!

But of all sad words about a plate,
The saddest are "it dropped when I ate".

And the wearer ne'er is satisfied
Until you've made him four or five.

Now throw your hat into the ring,
Let's all talk about the "pesky" thing.
Should the clasps be flat or round?
Is use of partials considered sound?

Would you wear one for yourself
Or would you keep it on the shelf?
Would you call it just a plate
Or "removable appliance" it designate?

When oft, at one I take a squint,
The name I call it looks not well in print.
Though it helps, it does not it adjust
And resort to other means I must.

There never was a plate, they say,
Like the one we made them, any way.
So with a most benign expression
We mix plaster for a new impression.

HOLEY MOLARS—A FAIRY TALE!

BY BERNARD FELDMAN, D.D.S., PERTH AMBOY, N. J.

ONCE UPON A TIME there lived a tribe called Teeth which had a fairy Godmother called Dame Nature who ruled over them in a wonderful way.

The Teeth lived in a wonderful land called Jaw, a land over-flowing with all the necessities of their life. Like trees, they were firmly implanted on fertile ground, and by means of their roots they drew upon the nerve and blood supply of Man for their life and sustenance. Irrigation was given to them from a constant stream of natural fluid called saliva; and banks of reddish gums fringed the crowns of the teeth. Dame Nature furnished Teeth with self-cleansing spaces; also highly-polished surfaces of an extremely dense substance called enamel. As a finishing touch, she added a mysterious power to the gums or saliva which endowed the mouth with a wonderful resistance to infection and a wonderful recuperative power to disease.

Years, years ago, Man lived the Simple Life in the most natural way. He lived in the glorious open, letting the sun and wind beat down upon his body. He ate coarse, hard foods, obtained by hunting and fishing. The teeth received exercise, fresh air and hard food. Consequently, they glowed with the natural brilliancy that comes from natural, healthful living.

As time went on, Man changed in his mode of living. To-day, Man has become like unto a mole. He arises from a restless slumber in a luxurious, comfortable bed, stationed in a steam-heated coop called a bed-room, 9 feet by 6 feet, at so many dollars per square foot per month. The dark-brown taste resulting from the spree of the night before has become so natural to him that it is no longer distressing nor unpleasant. Hurriedly dressing himself in clothes which cramp him from head to foot, and gulping down his "prepared breakfast foods," he is whirled down by the apartment elevator, through the subway and up again by elevator to his business offices.

Daily practice has made it possible for him to make the splendid time of forty-five minutes and some odd seconds from the time he awoke until he reached his desk to assume his daily business routine. Once engrossed in these cares, he passes the day in feverish haste, constantly straining the mind and body to the utmost. The day's work done, he thinks it is too goody-goody to spend the evening peaceably while there are so many livelier allurements. So he is whirled into unhealthy surroundings until the wee hours of the morning. And so Man's artificial life is being carried on from day to day.

In the meantime, little if any attention has been paid to his health. Why worry about one's health when one can be attending to business? Until one is down-and-out or lying on the flat of his back with complications of diseases, one does not appreciate this fact: that greater than all the glory, and fame, and wealth is GOOD HEALTH; and that Man must change his spirit of indifference to the recognition of the importance of preventive measures.

As time went on, things began to change and many enemies of the Teeth began to gather and threatened to disturb the peace which reigned in the land of Jaw. Bugs or germs swarmed down in great numbers, increasing rapidly because Man allowed food-stuffs to remain about the teeth, weakening the enamel and starting the Bugs on their work of tooth destruction. As these foods were no longer coarse and hard, but *soft* and sweet, it was particularly pleasing to the Bugs, who seemed to have a sweet tooth. Assisting these hordes of germs were other enemies, such as tartar, inefficient dental service, improper cleansing, drugging, pernicious habits, etc. All forces became united and made war upon the Teeth.

Attacked mercilessly on all sides, the Teeth called upon their fairy Godmother for help. Very much alarmed, Dame Nature called a council of war and arranged the Teeth in military fashion like so many soldiers, to guard the mouth. They gathered around her in a semi-circle, and she addressed them as follows:

"My dear children, great dangers are sorely pressing you because Man is ignorant and careless. Little does Man appreciate what I have done to protect you and how simple it is for him to act as your friend. I ask little of Man: all I want is to awaken him from his lethargy and assist my natural processes of sanitation and health in a simple way. Drugs for healthy normal tissue of the mouth are not welcomed by me. Brushing them with a *clean* tooth brush may or may not have been beneficial; but this crude method could certainly be improved to afford a more natural cleansing by more natural means. Such a method would mechanically remove all food-remains with the minimum amount of injury to the soft and hard tissues of the mouth, leaving the surfaces highly polished, and the tissues refreshed and wholesome.

"Certain Men are especially trained and licensed to give you, my dear children, expert care and attention. Yet few of them understand that I breathed the breath of life into you, and made you part and parcel of Man. You are a very important link—a *living* one—in the human chain. And when your life is removed and an abscess forms at your root end, it becomes as dangerous a focus of infection as any abscess in any part of the body. In fact it is even more serious in its ill effects than others, on account of its enclosed nature. You are LIVING things; yet dentists are cutting, grinding and slashing you, as if you were so many dummies, to support artificial restorations of silver and gold and porcelain whose presence in the mouth I more often resent than welcome. You were not designed nor constructed to hold heavy, extensive, gilded restorations upon your bodies or roots. The least that is done by dentists to your bodies, and still preserve the natural crowns and cusps in all their pristine beauty, the better is it for you teeth.

"They are undecided and unscientific about the treatment of teeth, going from one extreme to the other in very short periods of time. Because the practically harmless—perhaps, helpful—amœbæ were found to exist in pyorrhetic and normal mouths, Koch's postulates were forgotten in the mad rush to inject emetin as a cure. The real culprits—the pus-forming germs—were overlooked and practically allowed to go scot-free. That no rational treatment has been established as yet to cure pyorrhea is no compliment to dental science. Pulps or nerves were invariably and ruthlessly sacrificed up to two years ago; to-day the pendulum has swung to the other extreme of saving them at all hazards. Despised and held in contempt by dentists of a generation ago, Amalgam is King to-day. Other examples could be cited. Still the outlook for your preservation, my dear children, is getting brighter, because of these advances. Men are preaching the gospel of mouth-cleanliness in a forceful manner; and preventive dentistry is coming into its own.

"Men should respect the tissues of the mouth as highly as those of the eye. If the eye had a speck of dirt, Man would not brush it out, nor use strong drugs to chemically render it harmless; yet teeth have been brushed and drugged so long that it hurts me, and I say that it is time a more natural method should be adopted by the healing professions.

"It now rests with Man to heed my warnings, whether or not, my dear children, this fairy tale will end in the customary, 'and they lived happily ever-afterwards'."

EDITORIAL

INTERSTATE ASSOCIATION OF ANESTHETISTS

When, at its organization meeting in Cincinnati, in May 1915, the Interstate Association of Anesthetists decided to admit all licensed practitioners of medicine and dentistry, interested in anesthesia and analgesia, to membership, a step, equally as important as the establishment of the Section of Stomatology of the American Medical Association, was taken to combine the forces of the allied professions for advancing the science and practice of anesthesia and analgesia, and improving the status of the anesthetist.

At that time it was uncertain just what this association could offer the dentist to make his membership in the organization worth while. Through the efforts of its officers, however, and those of the National Dental Association, an agreement was reached for making the Louisville meeting of 1916 a joint session of the two organizations, and the Interstate Association was accorded the privileged distinction of becoming the Special Section of Dental Anesthetics for that occasion. This special session to accommodate the expected attendance will be held in Macauley's Opera House, on the morning of July 27, and includes the following interesting program:

Introductory: Wm. Hamilton Long, M.D., Louisville, Ky., Chairman I. S. A. A.

"Anesthesia and Analgesia in the Curriculum, the Clinic and Private Practice." (Chairman's Address)
Hugh W. MacMillan, D.D.S., Cincinnati, Ohio.

"Nitrous Oxid-Oxygen Anesthesia for Oral Surgery in the Forward Inclined, Sitting-Posture."
Ira O. Denman, M.D., Toledo, Ohio.

"Vapor Anesthesia for Oral Surgery."
Truman W. Brophy, M.D., Chicago, Ill.

"Intra-Oral Methods of Local Anesthesia for Oral Surgery."
Rich. H. Riethmuller, D.D.S., Philadelphia, Pa.

"Extra-Oral Methods of Local Anesthesia for Oral Surgery."
Kurt H. Thoma, D.M.D., Boston, Mass.

During the other scientific sessions of the Interstate Association of Anesthetists, which will be held in Hotel Seelbach, many other papers on anesthesia and analgesia, of vital importance to dentists as well as surgical anesthetists, will be presented. Many of these, as well as those of the special section meeting, will be illustrated by lantern slides and moving picture demonstrations.

The latest researches in physio-pathology of anesthesia will be covered by such authorities as Everets Graham, D. E. Jackson, Emmet F. Horine, John N. Heim and Moses Salzer; while phases of the technical administration will be presented by W. H. Long, F. G. Du Bose, Carl H. Davis, Joseph E. Lumbard.

The Afternoon Session of July 27 will be of especial interest to dentists as the following papers on the Program will testify:

"Oral Hygiene in Relation to Anesthesia, Analgesia and the Anesthetist."
Bion R. East, D.D.S., Detroit, Mich.

"Handling Emergencies under Anesthesia and Analgesia"
N. T. Yager, D.D.S., Louisville, Ky.

"The Study of Disputed Points in the Technic of Local Anesthesia for Oral Surgery."
S. D. Silverman, D.D.S., Atlanta, Ga.

This is probably one of the most interesting and profitable programs in anesthesia ever offered the members of the allied professions.

As the majority of dentists are not as well posted in anesthetics and anesthesia as they should be, and as the dentistry of today requires a more extensive use of anesthesia, this meeting, and future meetings of the Interstate Association, offer a great opportunity to all. The policy of the Interstate Association of Anesthetists is to meet every year in the Middle West with some large medical, surgical or dental association, in order to promote the interests of anesthesia and the standing of the professional anesthetist.

Those in charge of the organization realize that its aims and purpose will be best achieved by the cooperation and support of all the dentists in the Middle West who are interested in anesthesia and analgesia.

The association has its own official journal which prints its transactions and assists in accomplishing its policies. The association, through its journal, was able to "nip in the bud" an undesirable legislative movement in New York and secure the consideration of a substitute bill which placed the dental anesthetist on an equal footing with his medical confrere and conserved all his professional rights in the practice of this specialty.

The nurse-anesthetist and the unlicensed administrator evils have been attacked in Ohio and Georgia through State Medical Boards, and progress has been made in abolishing these abuses.

The association has undertaken the publication of a Year-Book of Anesthesia and Analgesia, the first volume of which is now in press, which among other articles will contain contributions from some of the most authoritative dental anesthetists, showing that the dental aspects of anesthesia and analgesia are being given the attention and prominence they deserve.

The association expects, also, through its members of the allied professions, to establish the teaching of anesthesia and analgesia in the curricula of all medical and dental schools, to provide expert service of trained anesthetists in all clinics and hospitals, and to extend the beneficence of this "millenium" into private practice.

In its ultimate analysis this is an effort on the part of the surgeons, anesthetists, dentists and research workers of the Middle West to bring anesthesia into "its own." If such a propaganda appeals to you, become a member.

At the Louisville meeting an association dinner will be served on the evening of July 26, at Hotel Seelbach, and will be enlivened by such post-prandial celebrities as F. G. Du Bose, G. A. Hendon, J. R. Callahan, and G. F. Butler.

An historical section and musicale will follow with papers by Wm. Harper De Ford, E. M. Magruder and C. J. S. Thompson.

L'AIDE CONFRATERNELLE

We have received from this professional association of France, a circular letter addressed to editors of prominent dental journals and presidents of some of our dental societies, that their work may be made known to American dentists.

The following translation will give our readers an idea of what the organization has done and what they desire from their foreign confreres:

"Up to the present time l'Aide Confraternelle, founded in Paris, March 2d, 1915, to aid French dentists and Belgian war sufferers, has appealed only to French dentists.

"Although more than half of our members are in arms and although many among the others are more or less financially embarrassed, yet our organization has collected subscriptions which at present amount to 50,000 francs ($10.000).

"Beside the exclusively French subscriptions, others have given unsolicited, to our cause; among them English, Canadian, Spanish, Italian, etc. These gifts have given us great pleasure. They show us that the bonds which were established at our international congress were sincere, and that the elite of our profession, so great in knowledge, is perhaps greater in heart.

"So we have believed it our duty to make our work known everywhere in order to benefit the French and Belgian victims belonging to our profession, because the great movement of enthusiasm grows every day among the neutral nations in favor of the cause of the allies, which is the cause of humanity. Since they have not the power of understanding as Belgium and France, enduring on their own soil the attack of the invader, we know with what admiration they consider the extent of our sacrifices and feel assured of necessary reparation.

"At present our society is everywhere at work collecting subscriptions. If we have enough for present needs, yet we know that after the war it will be necessary to aid those whose homes have been destroyed, those who have been maimed, and also the widows and children of our dead heroes. It is because we know how great the disaster will be and how many war victims there will be, that we have decided to make known our needs to foreign dentists, to those who do not know the horror of war and who in the midst of great disaster, still enjoy the blessings of peace.

"We wish to address our circular to all foreign dentists, so we have chosen the editors of journals and presidents of societies as our medium.

"We ask the former to place in their journal a note in favor of our work, and we ask of the latter to speak of the Aide Confraternelle at their next meeting, since we know from the good reputation of both (journals and societies) that we will procure the best results in this way.

"Trusting in your devotion to this good cause to which we solicit your aid, we beg of you to agree with our plan.

"Most honored Brother, you have the most sincere regards of all the members of the Committee of Propaganda among whom you will not fail to find sincere and devoted friends."

Among the members of the committee are: Drs. Amedo, Bardem, Choquet, Davenport, d'Argent, Fontanel, Gordon, Lannois, Sauvez, Viau and others of Paris; Chiavaro, Rome; Mummery, London; Guy, Edinburgh; Quatermann, Brussels; and prominent dentists in other cities.

This is a most worthy cause and those of our readers who desire to make contributions can send them to either Dr. Fontanel, treasurer, 109 Boul. Malesherbes, Paris, France, or send them to The Dental Summary and we will see that they are forwarded to the association.

A man who is in the dumps can say to himself: "Come now, brace up! Be cheerful!" but that will not make him so. What he can do, and do successfully, is to make himself act the way a cheerful man would act: to walk and talk the way a cheerful man would walk and talk, and to eat what a cheerful man would eat—and after a time the emotion slips into line with his assumed attitude. He actually becomes what he has been pretending to be.—*Luthur H. Gulick.*

CORRESPONDENCE

WHERE IS THE OLDEST DENTAL SOCIETY IN THE WORLD?

Editor The Dental Summary: On page 524 of the June issue of The Dental Summary I notice that the St. Louis Dental Society, in announcing its 60th anniversary meeting, lays claim to the title of oldest dental society in the world. This society was organized December 16th., 1856. (History of Oral and Dental Science in America, page 164).

In behalf of historical accuracy, I beg leave to submit the credentials of another candidate for the honor of being called the Methuselah of dental societies. The Michigan Dental Society was organized January 9th, 1856, and is very much alive, thank you! See *Dental Review*, Vol. 7 page 577. Transactions of Michigan Dental Society for 1882 page 141 et seq. and *Koch's History of Dental Surgery* page 896. The existence of a dental society in Michigan was entirely overlooked by the compilers of *History of Oral and Dental Science in America.*

Furthermore, in behalf of the above-mentioned historical accuracy, since the demise of the venerable Mississippi Valley Assocation of Dental Surgeons, there was only one society that antedates the Michigan Society viz., the Pennsylvania Association of Dental Surgeons, which was organized December 16th., 1845. If this society is still in existence it is entitled to wear the long gray beard or whatever the proper insignia may be for the oldest dental society. However, I have seen no notice of it for some years.

Sincerely yours,
Thomas D. Dow, D.D.S.,
Stanton, Mich.

Editor of The Dental Summary: The statement, page 524, June number of The Dental Summary, under the title, "Where is the oldest dental society in the world?" is an error. It is not in St. Louis, but right here in Philadelphia, as you will see by the notice of its next monthly meeting. It has had a continuous existence since December 16, 1845. I was elected a member, April 1866, and have rarely missed a meeting during the past fifty years.

When organized, its membership fairly well covered the state of Pennsylvania, but it soon became a local society as other like local societies were organized; all of its meetings have been held in Philadelphia.

Yours respectfully,
William H. Trueman,
47 High St., Germantown,
Philadelphia, Pa.

June 10, 1916.

MISCELLANY

Dr. Burton Lee Thorpe, of St. Louis, delivered the commencement address at the University of Tennessee, Memphis, on June 8th, 1916. In speaking of the dental profession he said:

"Tradition and fact are both correct that the early practitioners of the dental craft were barber, blacksmith and traveling tinker, who crudely practiced the dental art, as a side line to their respective callings. This continued until 1839, when by the efforts of Dr. Horace H. Hayden and Dr. Chapin A. Harris the most potent factors in the history of our profession, viz.: the Baltimore College of Dental Surgery, the American Journal of Dental Surgery, and in 1840 the American Society of Dental Surgeons, were organized each being the first in the world's history.

"Do you remember that it was a Boston pioneer dentist who made that famous night ride of April 18, 1775, warning the countryside to arms, the ride that fanned the smouldering flames of patriotism into a great fire, and the next day followed the battles of Lexington and Concord, which eventually resulted in American independence? That man was Paul Revere.

"We also are proud of the fact that two of humanity's greatest benefactors, Dr. Horace Wells, the discoverer of anesthesia by the administration of nitrous oxide gas (1844), and Dr. Wm. T. G. Morton, the discoverer of anesthesia by the administration of sulphuric ether (1846), were both American dentists.

"Our profession has made marvelous advancements in the past seventy-five years, and one of the most potent sources of our professional advancement in spreading the gospel of prophylaxis has been our National Dental Association, which formerly had 800 members, but since its reorganization, a few years back, now has 20,000 members and publishes the Journal of the National Dental Association, that has a far-reaching influence; but the best thing of all is the recent establishment of the National Dental Association Research Institute, located at Cleveland, Ohio, which is working along similar lines as is the Rockefeller's Institute and the Carnegie Foundation.

"The cause and cure of various diseases in the general system resulting from diseases of the teeth and mouth are marvelous and almost unbelievable. We have absolutely proven that from diseased teeth such diseases as appendicitis, intestinal, heart and kidney diseases, stiff joints, rheumatism and gout result and can be cured by the treatment, cure and filling of the diseased teeth and surrounding tissue.

"A few years ago we claimed the disease of the teeth and gums called pyorrhea was caused by rheumatism or gout; now we know pyorrhea causes rheumatism and gout and kindred other diseases. All these we have proven by our researches and by so doing have earned the respect and appreciation of the medical profession, who are working in conjunction with us in our research experiments.

"You young men who graduate this evening with the D. D. S. degree have no reason to be ashamed of your profession, for it ranks and has equal standing with the other learned professions, such as medicine, law and theology, and you as a dental surgeon are just as necessary to the community in which you are to reside as are members of the other callings, provided, of course, you are the clean, decent, honest sort of a man the people expect you to be these days.

"No matter what profession you are a member of, you must have a conscience and a heart, and dealing with human life as you are as medical men and pharmacists and with the most sensitive tissue as dentists, you will find it is the kindly, sympathetic, conscientious man that gets the most and best out of life."

COMMUNICATIONS

APPELLATE COURT DECIDES DOCTOR TAGGART CANNOT SUE THE DENTISTS COLLECTIVELY

On June 13, 1916, The United States Circuit Court of Appeals for the Seventh Circuit, rendered its decision that Dr. W. H. Taggart cannot undertake to enforce his claims by bringing suit against dentists jointly or collectively.

No questions as to the validity or scope of the Taggart patents were involved in this appeal.

The question as to Dr. Taggart's right to maintain a single suit against all of the alleged infringers in a given district came before the Court of Appeals as follows:

About two years ago Dr. Taggart's attorneys began sending out letters to the dentists in Chicago and northern Illinois, demanding that they pay Dr. Taggart $150,00 within five days and threatening to commence an infringement suit if they failed to comply.

Dr. Taggart immediately began separate suits against those who did not promptly meet his demand. The Dentists' Mutual Protective Alliance was then organized, and its attorneys, C. C. Linthicum and Lynn A. Williams, of Chicago, undertook the defense of those of its members against whom separate suits had been brought.

Some of those against whom suit had been brought, settled. Dr. Taggart then abandoned his separate suits against those who would not settle, and brought a single suit against scores of dentists, adding to that suit from month to month. Finally after five hundred and twenty-three defendants had been brought into the one suit, Judge Konesaw M. Landis of the United States District Court, before whom the case was pending, ordered that Dr. Taggart should join no more dentists as defendants.

When this collective suit came to trial, in June, 1916, the first question to be raised was that of Dr. Taggart's right to deprive each man of his day in court by suing all of them jointly. Upon this question, Judge F. A. Geiger, before whom the matter was tried, held that there was an improper joinder of defendants and dismissed Dr. Taggart's suit as to all of the defendants save one.

The trial then proceeded as to the one defendant selected by Dr.Taggart, and twelve others selected and voluteered by the Alliance in order to secure a series of test cases in which every possible question as to the merits of Dr. Taggart's patents and his claims of infringement, might be finally determined. These test cases are still pending in the District Court at Chicago.

Meanwhile Dr. Taggart took an appeal upon the sole question as to his right to maintain a single suit against dentists collectively. It was upon this one phase of the matter that the Court of Appeals has just rendered its decision.

There is nothing in this decision, therefore, which will prevent Dr. Taggart from commencing separate suits against individual dentists.

The officers of the Alliance hope to raise funds sufficient to make a thorough-going defense of the "test cases" now pending, so that the merits of Dr. Taggart's contentions may be finally and conclusively settled.

THE DENTISTS MUTUAL PROTECTIVE ALLIANCE
GUY B. WEBSTER, *Ass't Secy.*

DENTISTS HERE BEFORE COLUMBUS.

IT HAS long been known that the American dentists lead the world in the practice of dentistry. The researches of an English dentist, Dr. Marshall H. Saville, in Central and South America prove beyond a doubt that the practice of dentistry in America antedated that in Europe. In fact, dentists were known before the discoveries of Columbus.

Several skulls in which teeth were inlaid with gold or jadeite were found by Dr. Saville. One is called the Atacames and was found in the Province of Esmeraldas, Ecuador. Its upper jaw contains two extraordinary teeth. The middle incisors each bear a disk of gold that had been inserted in a cavity drilled in the enamel as perfectly as any modern dentist could do it.

Another interesting set of teeth is owned by Dr. Saville, but they were found by George D. Hadian, our American consular agent at Ecuador. The incisors and canine teeth are almost entirely covered on their outer surface by an overlay of gold.

A broad band of enamel has been filed off, leaving enamel only at the cutting edge and close to the gum. In some instances the sawing has been done slightly under the enamel, so that the gold might be held securely. The gold has gone from all the teeth except the left incisor. On some of the others traces of cement are still seen.

In Mexico Dr. Saville found teeth filled with hematite, turquoise, rock crystal and obsidian setting. At Copan he discovered a lower jaw with an artificial tooth carved out of some dark stone.

Dr. Saville asks how the owners could have stood the pain of slow cutting by stone drills with sand and water, for no metal tools with which the work could have been done have been discovered. He suggests that these people must have known the property of coca in producing local anesthesia. The people of the coast were addicted to chewing coca leaves mixed with lime, and it is believed they must have used this in deadening the pain of drilling and sawing.

The gold and jeweled inlays are as skillfully done as those of a dentist of today. There is no sign of decay either behind or around them, which proves with what splendid accuracy this work was done.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

An Appreciation.

In the scheme, previously announced, for a dental service in the French Army, 1,000 qualified dentists will be gazetted adjutants, and of these one-half will serve at the front and the remainder at the depots. There will be provided with each group of stretcher-bearers a mobile dental staff who can attend to the men's teeth in their cantonments. Dental clinics are to be attached to each hospital center, and a sufficiency of mechanical institutes provided up and down the country. The Bishop of Birmingham recently visited the west front, and being well acquainted with the good work done for dental service by the late Lord Mayor of that city, he was keenly observant of all that he saw and heard in connection with dental treatment of the French Soldiery. His experience would suggest that our own men are in a worse case from this point of view than our Allies. One Frenchman told him "that it seems to be forgotten that men at war require dentists quite as much as horses need blacksmiths," and he added that "if the men who are now in hospital through disease consequent upon bad dentition had been cared for and received proper teeth, during one year, there would now be 30,000 more men at the front in the French army." He states that "LaRoulette," the motor dental van attached to the 6th Army, has proved "immensely helpful."—*The Dental Record (British) News and Notes.*

Trials of the European Dentist

Miss Caroline Wilson, who left the Ford party at The Hague and traveled to Berlin, has had excellent opportunities of studying the internal conditions of the German Empire. She gives some examples of the unceremonious manner in which metal articles are commandeered from households. "Kitchen range doors have disappeared, as well as all copper and brass articles. I met an indignant dentist in Berlin who had been in America on a vacation. During his absence the Government inspector had come round for a list of copper and bronze articles in the house. The over-conscientious maid had not missed a thing, including all his instruments, so when he came home, he had a denuded office to greet him."—*News and Notes, Dental Record.*

Health and Sanitation in the Armies.

It is estimated that 12,000 medical men are with the British army; 800 dentists are busy attending to the teeth of the German soldiers. Just how many are with the Allies is not known. Modern sanitary science has had a great try-out and proved its worth in the prevention and suppression of disease in these great armies and this under the most trying conditions. In every war, previous to this, more men were incapacitated by disease than the bullets of the enemy.
—*Note and Comment, Oral Hygiene.*

Varnish For Silicate Cement Fillings.

A good varnish for protecting silicate cement fillings against moisture may be made by dissolving sticky-wax in ether.—*R. S. Boys, Commonwealth Dental Review.*

Septic Teeth: Cured or Extracted.

It is now known that a tooth may show no clinical signs of disease, and the X-ray show apical abscess. When about to devitalize a tooth, always remember that a dead tooth is a candidate for infection. Unless septic teeth can be cured promptly they must be extracted, and the patient must endure the loss of masticating power.—*Judson Daland, Dental Cosmos.*

Artificial Dental Exercise.

The constant chewing of gum overtaxes the salivary glands to such a degree that there is little response to the normal stimulus of food, resulting in quantities of other liquids being swallowed during a meal in an attempt to supply the loss. The irritation to the stomach occasioned by the abnormal flow of saliva between meals, and the displacement of saliva by other fluids during meals, cause those digestive disturbances which usually accompany this objectionable habit. Exercise the teeth by all means, but exercise them as Mother Nature intended by the mastication of properly selected food, and not by an artificial method such as the chewing of gum.—*Editorial, Oral Health.*

A Physician's Testimony.

A high tribute should be paid to the American dentists, who are doing the best surgical work I have ever seen—replacing teeth, molding the jaw, treating fractures of the jaws and correcting deformities.—*Geo. W. Crile, M.D. Oral Hygiene.*

Bibulous Paper Preferable to Cotton.

Once accustomed to using bibulous paper and you will have very little use for cotton. Its absorbent qualities are ten times those of cotton.

—*E. J. Perry, Washington, Iowa. Dental Review.*

Narrow Bicuspid Spaces in Bridgework.

How often we find the bicuspids must be replaced with a bridge from first molar to cuspid and the space is too narrow for two bicuspids and too wide for one. Such cases can be artistically restored by using a thick, wide molar facing which fills the space, grinding the buccal and occlusal surfaces to resemble two bicuspids. Use a sharp knife-edged stone while grinding buccal surface. It is not necessary to cut through the facing; simply grind to give it the appearance of two bicuspids, then finishing the lingual and occlusal surfaces in the usual manner by casting. By this method one platinum pin is near the center of each bicuspid reproduction. If two narrow bicuspid facings are used they look like rat teeth. Grind a wide molar facing by this method and keep for future reference—*W. O. Fellman, Oak Park. Ill. Dental Review.*

Painless Dentistry.

No dentist can honestly promise to render painless service, and yet it is important that every operator should cause the minimum of pain. Painless dentistry, in so far as that may be possible, has a decided economic value. It is the judgment of the writer that fifty per cent. of the pain and discomfiture of our patients at the present time could be eliminated by the use of sharp instrument, a true-running dental engine, sharp burs and abrasive stones that don't wobble.—*Wallace Seccombe, Oral Health.*

To Prevent Checking of Porcelain in Casting.

When casting on porcelain turn the investment over immediately so the bottom of surplus gold is excluded from the air, allowing the whole to cool evenly. The facing will not check when this is done promptly. This also applies to solder work.

—*J. S. Bridges, Chicago, Ill. Dental Review.*

Thoroughly Mix Your Amalgam.

Thorough mixing will develop the quality of adhesiveness in most alloys, so that they will be found more dependable for frail posterior teeth than any of the cements, and with perfect adaptation no discoloration of tooth substance will occur.—*Wm. E. Harper, Dental Cosmos.*

Under modern conditions a dental operator is no more morally excusable for sealing up pathogenic bacteria in a root-canal than is a surgeon for sewing up a sponge or hemostatic forceps in an abdominal cavity.—*Editorial Dental Cosmos.*

To Remove the Stain of Iodin.

Iodin stain can easily be removed from dental napkins and other fabrics by washing the spots in ammonia water.—*H. A. Cross, Chicago, Ill. Dental Review.*

Treating Chronic Alveolar Abscess.

It is beginning to be pretty well conceded that the only sure way to treat a chronic alveolar abscess without merely closing up the fistula and making a blind abscess out of it, is to perform a root-amputation on it and curette the abscess cavity removing all the granulation tissue, the infected root end, all carious bone, and properly sealing the canal opening in the smoothed root end.—*C. R. Giles—Pacific Dental Gazette*

Removals and the Anti-Narcotic Act.

Most dentists who are registered under the provisions of the Harrison Anti-Narcotic Law are ignorant of the fact that a provision in the law provides that in the event of a change in location the Internal Revenue Collector be notified of such changes. It will be well for any who have removed and have not done as stated above to comply with the law before a fine is imposed.—*Editorial, Western Dental Jorunal.*

Soft Wax for Gingival Margin.

In some inlay cavities it is difficult to secure a good impression of the gingival margin with hard inlay wax. In these cases after attempting the impression with hard wax, add soft wax to the cavity side of the impression. Warm the whole slightly and replace in cavity, having patient bite, etc. An accurate impression can be obtained in this manner.

—*Albert E. Converse, Springfield, Ill., Dental Review.*

GETTING EVEN

James, four years old, had been naughty to the point of evoking a whipping from his long-suffering mother, and all day long a desire for revenge rankled in his little bosom.

At length bedtime came, kneeling beside her, he implored a blessing on each member of the family individually, his mother alone being conspicuous by her absence. Then, rising from his devout posture, the little suppliant fixed a keenly triumphant look upon her face, saying, as he turned to climb into bed:

"I s'pose you noticed you wasn't in it."—*Harper's Magazine.*

The man who succeeds above his fellows is the man who early in life clearly discerns his object, and toward that object habitually directs his powers. Even genius itself is but fine observation strengthened by fixity of purpose.—*Lord Lytton.*

SOCIETY·ANNOUNCEMENTS

OFFICIAL PROGRAM OF THE TWENTIETH ANNUAL SESSION OF THE NATIONAL DENTAL ASSOCIATION

"Silicate Cements"	Dr. W. Clyde Davis
"Taking Impressions in Modeling Compound and Anatomical Setting up of Teeth"	Dr. James P. Ryul
"Prevention of Permanent Malocclusion"	Dr. L. Lowe Young
"System in State Society Work"	Dr. A. M. Flood
"The Post-graduate Type of Dental Meeting"	Dr. C. R. Lawrence
"Essentials for Success of the Progressive Clinic Plan"	Dr. Weston A. Price
"The Relation of Mouth Infections to Systemic Infections"	Dr. Thomas B. Hartzell
"Root Canal Fillings"	Dr. John R. Callahan
"Studies for the Identification and Differentiation of Pathogenic Organisms of Mouth Infections"	
"Galvanic Medication Studies, Including Electric Ionization	Dr. Weston A. Price
"Peridental Membrane"	Dr. Frederick B. Noyes
"The Relation of the Glands of Internal Secretion to Dental Problems"	Dr. Wm. J. Gies
"Salivary Analysis and Dental Caries"	Dr. Russell W. Bunting
"Salivary Deposits"	Dr. Percy W. Howe
"Oral Hygiene in Its Relation to Public and Individual Health"	Dr. Otto U. King
"The Eastman Dental Dispensary"	Dr. Harvey J. Burkhart
"Surgical Treatment of Pyorrhea"	Dr. Carl D. Lucas
"Prophylaxis for Pyorrhea Patients"	Dr. Paul R. Stillman
"Prophylaxis for Children"	Dr. Gillette Hayden
"The Evolution of the Principles of Regulating Appliances"	Dr. Martin Dewey
"Some Phases of Early Orothodontic Treatments and Developments"	Dr. Frank M. Casto
"Application of Amalgam in Modern Dentistry"	Dr. John V. Conzett
"Crown and Bridge Work"	Dr. Forrest H. Orton
"Chemistry and Metallurgy"	Dr. J. P. Buckley
"Anesthesia in the Curriculum, Clinic and Private Practice"	Dr. Hugh W. McMillan
"Tonsil and Sinus Surgery under Nitrous Oxid-Oxygen Anesthesia in the Forward Suspended Sitting Posture"	Dr. Ira O. Denman
"Vapor Anesthesia for Oral Surgery"	Dr. Truman W. Brophy
"Intro Oral Methods of Local Anesthesia"	Dr. Rich. H. Riethmuller
"Extra Oral Methods of Local Anesthesia"	Dr. Kurt H. Thoma
"Handling Emergencies under Anesthesia and Analgesia"	Dr. N. T. Yager

ORAL SURGERY CLINIC

"Dental Cements"	Dr. Marcus L. Ward
"Brown Stain Problem"	Dr. F. S. McKay
"Metallurgical Researches"	Dr. Frank A. Fahrenwald
"Dental Education"	Dr. H. L. Banshaf
"Education of the Public on Oral Hygiene, Through the Dental Society"	Dr. T. P. Hyatt
"Efficiency in State Society Work Depends on Publication of a Monthly Journal of the National Dental Association"	Dr. Otto U. King

"State Societies Organized for Legislative Purposes"......................**Dr. Homer C. Brown**
Sectional Progressive Clinic.

CLINICS OF THE NATIONAL DENTAL ASSOCIATION

The Clinic Committee of the National Dental Association has arranged for two half clinics, an Illustrated Lecture Clinic and a Progressive Clinic; and Surgical Clinics under conductive and general anesthesia for the annual meeting to be held in Louisville, July 25–28, 1916.

ILLUSTRATED LECTURE CLINIC, Wednesday, July 26th, 1:30 P.M.

These clinics will be presented to the entire membership in attendance at Keith's Theatre having a seating capacity of over three thousand people. Time to be occupied by each clinician will vary from twenty to twenty-five minutes. Clinicians and subjects they will present are as follows:

Dr. Thomas P. Hinman: Therapeutic treatment of pulp diseases when the vitality of the pulp cannot be retained, including the aseptic management of root canal treatment; condition of outside of tooth, rubber dam and holder, broaches and cotton employed in the application of remedies, not including the opening up or gaining access to constricted canals.

Dr. J. R. Callahan: The technic of root canal filling with rosin and the opening of small and constricted canals.

Dr. R. Ottolengui: The technic of root canal filling with gutta percha preparations.

Dr. J. D. Patterson: Indications and contra-indications for treating teeth involved with pyorrhea alveolaris including statements having suggested remedies including emetin. Discussion not to include the technic of instrumentation or the care of the tooth surfaces by the dentist or patient.

Dr. Weston A. Price: Oral Infections with special reference to bacteriology.

Dr. E. T. Tinker: Bridge abutments for vital teeth with exhibition of radiographs showing conditions of periapical tissues after the lapse of time.

Dr. C. N. Johnson: Practice managements, business investments and a dentist's duty to his profession.

PROGRESSIVE CLINIC, Friday, July 28th.

These clinics will be held in the balcony of the Armory which is to be divided into twenty-four rooms with seats arranged in amphitheatre form. The demonstrations will be given by members of the National Association residing in Michigan, Indiana, Kentucky and Tennessee. The thought back of the plan of confining the progressive clinicians to members of the National District in which Louisville is located, is for the purpose of showing the profession at large the type of dentistry being accomplished in this particular section of the country. The subjects to be presented are as follows:

Cement Clinic: All forms, the technic of mixing and insertion.

Porcelain Clinic: Porcelain jacket crown, its indication and technic of construction.

Radiography Clinic: Interpretation of dental radiographs.

Local and Conductive Anesthesia: The technic of making novocain suprarenin solutions, the care of the syringe, needles, etc. The technic of injections of novocain suprarenin for local and conductive anesthesia.

Removable Bridge Work Clinic: Partial dentures and removable bridge work with description of the various forms of attachment including the type indicated to engage vital teeth.

Impression Taking in Modeling Compound Clinic: Taking impression in modeling compound with the mouth closed and under normal biting stress.

Full Denture Clinic: Full dentures not including impression taking.

ORAL SURGERY CLINIC, Thursday, July 27th, 10 A.M. to 12:30 A.M.

Operations under conductive and general anesthesia will be held in the City Hospital. Types of operations to be performed are as follows:

LOCAL AND CONDUCTIVE ANESTHESIA: Cavity preparation, pulp removal and extraction of teeth under novocain suprarenin anesthesia.

Antrum operations and alcohol injections for trigeminal neuralgia under novocain suprarenin anesthesia.

Removal of impacted inferior third molars under novocain suprarenin anesthesia.

Root end amputation of teeth under novocain suprarenin anesthesia.

GENERAL ANESTHETIC: Cleft palate, harelip and such other cases as present.

Committee
C. N. HUGHES.
H. B. TILESTON.
WM. H. G. LOGAN, *Chairman*
29 E. Madison St. Chicago, Ill

General Plan for the Twentieth Annual Session of the National Dental Association

While no sensational changes are contemplated in the general plan of this annual session of the National to be held in Louisville, July 25-26-27-28th, there are a number of decided improvements which will be inaugurated.

OUTLINE AND LOCATION OF SESSIONS

The first day will begin with registering all members and guests, at the spacious First Regiment Armory rotunda; such facilities will be provided as will make registration a pleasure. The ladies will register on the mezzanine floor of the Seelbach Hotel which will be their headquarters and from which all entertainments will start.

Opening session will be held in Keith's Theatre, seating over 3000 very comfortably. This theatre is artificially cooled to the temperature of 65 degrees during summer months, and of its acoustic properties Dr. Thomas Hinman had this to say, after a recent inspection: "Nowhere, with the exception of the Mormon Temple at Salt Lake City, have I observed such wonderful acoustic properties."

All general sessions and some special sectional meetings will be held in this theatre, which is diagonally across the street from registration headquarters, one block from Seelbach Hotel, and one-half block from the Watterson Hotel and Hermitage Hotel.

The splendid auditoriums of the Seelbach and Watterson Hotels will be used for sectional meetings as well as McCauley's Theatre, across the street from the Seelbach. Altogether there will be four sectional meetings in progress at the same time, so every phase of modern dentistry will be presented in the most approved manner.

Drs. Hinman, W. H. G. Logan, O. U. King and E. G. Link, of Rochester, while on visits to Louisville, expressed surprise at the fortunate arrangements of buildings in which the sessions could be held, for all hotels and theatres which will be employed are within the radius or length of two (2) city blocks; going from east to west, from Fourth street on Walnut, they are McCauley's Theatre, Seelbach Hotel, Henry Watterson Hotel, Keith's Theatre and First Regiment Armory where registration, exhibits and progressive clinics will be held.

NOTABLE CLINICS ON WEDNESDAY

Perhaps the greatest treat the profession has ever enjoyed will be provided on Wednesday afternoon when, under the supervision and direction of Dr. W. H. G. Logan, four hours and one-half will be devoted to "Illustrated Lecture Clinics," presented by men of acknowledged authority upon the subjects on which they are to speak.

This is a new feature of a National meeting and affords every member in attendance an equal opportunity to hear and see the same good clinics, and when the profession is assured that Dr. Logan has complete charge of this branch of the meeting it warrants us to expect something out of the ordinary.

MORE CLINICS ON FRIDAY MORNING

The great balcony of the First Regiment Armory will be divided into twenty-seven sections, each to seat from one hundred and twenty-five to one hundred and fifty members and visitors. There will be twenty-seven clinicians, divided into three branches of dentistry and the outline is so arranged that every man, by remaining in his seat, will see every one of the twenty-seven clinics in the morning allotted for this branch of the work. Much thought and careful study have been devoted to this work and it should be a strong feature in attracting the members of the National to this meeting.

ANOTHER ATTRACTIVE FEATURE

A feature of special interest to many members of the National will be the joint meeting of the Interstate Anesthetists, a strong body of both medical and dental men having special interest in anesthesia. A strong program for a joint meeting has been arranged, including the following men: Drs. Long, McMillan, Denman, Brophy, Riethmueller, Thoma and Yager, who will discuss the following subjects: "Oral Operations under Nitrous Oxide-Oxygen in the forward inclined sitting posture"; "Vapor Anesthesia for Oral Surgery"; "Intro-Oral Methods of Local Anesthesia"; "Extra-Oral Methods of Local Anesthesia;" "Handling Emergencies under Anesthesia and Analgesia in the dentist's office." After this session, which takes place on Wednesday at McCauley's Theatre, this organization will hold a three days' session in the Red Room of the Seelbach, to which all dentists interested in this useful branch of our healing art are invited.

Second Annual Meeting of the Interstate Association of Anesthetists

The Second Annual Meeting of the Interstate Association of Anesthetists will be held at the Hotel Seelbach (Red Room), Louisville Ky., July 26 and 27, in conjunction with the National Dental Association.

A splendid program has been arranged and a banquet will be served.

For further information and dinner reservations address,

F. H. McMechan, M.D., *Sec.-Treas.*,
Avon Lake, Ohio.

National Association of Dental Faculties

The National Association of Dental Faculties will hold its next meeting at the Seelbach Hotel, Louisville, Ky., July 22 and 24, 1916.

Charles Channing Allen, *Sec'y*,
N. W. Cor. 10th and Troost, Kansas City, Mo.

North Dakota Board of Examiners

The North Dakota Board of Dental Examiners will hold its next meeting in Fargo, July 11th, at 9 o'clock and will continue four days.

All applications and credentials *must* be in the hands of the secretary July 1st.

For application blanks and information address

W. E. Hocking, *Secretary*,
Devils Lake, N. D.

California State Dental Association

The forty-third session of the California State Dental Association will be held at the Palace Hotel, San Francisco, July, 12, 13, 14 and 15.

We hope to make this an attractive meeting—men of national prominence have been secured. Our own members will present clinics on every subject of importance. A cordial invitation is extended to all who may be interested.

Exhibitors wishing space may secure information from the Secretary.

C. D. Gillman, *Pres.*
Oakland Bank of Savings Bldg.,
Oakland, Calif.

John E. Gurley, *Secretary,*
350 Post Street,
San Francisco.

XI Psi Phi Fraternity

The annual meeting of the National Alumni Association of the Xi Psi Phi Fraternity will be held at the Watterson Hotel, Louisville, Ky., Monday, July 24, 1916.

Important matters will be presented and all members of the Fraternity are requested to plan their arrival in Louisville, to attend the meeting and the banquet the same evening.

The Xi Psi Phi headquarters will be at the Watterson, and reservations should be made in advance.

Clarence O. Simpson, *President.*
Charles D. Gilman, *Secretary.*

Northern Indiana Dental Society

The Northern Indiana Dental Society will hold its Twenty-eighth Annual Meeting in Kokomo, Indiana, October 12, 13, 1916.

The meeting bids fair to be the largest meeting ever held in northern Indiana.

The papers to be presented are of vital interest to every dentist of the State, and are subjects never before presented to a dental society in the state. Many good clinics are also booked for the meeting.

Respectfully,
Chas. A. Priest, *Secretary.*

Lucky is he who can get his grapes to market and keep the bloom upon them, who can carry some of the freshness and eagerness and simplicity of youth into his later years, who can have a boy's heart below a man's head.—*John Burroughs.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

Before you forget it, Dr. Bridgeworker, turn to the article by Dr. R. W. Sweetnam in this issue and read it carefully. One doesn't need to be a dentist to see that here is a decided advance that should have the attention of the entire profession. Men have been knighted for lesser service.

Look, whose here! New York city is finally beginning to dream dreams. She'll wake up one of these days, realize that Lil' ol' Detroit and even some smaller places lead her in oral hygienics, and begin to do things. Just now she is talking in her sleep about a five million dollar dental dispensary and research institute, with free school clinic and all other attachments. And dreams sometimes come true!

Boston now has the first Italian woman dentist in the person of Dr. Fenecia Leonardi, a Dorchester woman, who will practice in the North End.

A charitable or beneficent individual who refuses to make known his identity, has offered to fit up a dental clinic in the Ithica, Y. N., public schools. Wonder if the B. of E. will accept, or prefer to remain "consistent!"

Buffalo wants a central dental dispensary.

Now concluded that the premature death of the Northwestern Railway King, J. J. Hill, was caused by diseases arising from the neglect of teeth. Too bad that humanity cannot be prevailed upon to make any important step in advance except at the cost of many lives.

The Health Commissioner of Patterson, N. J., has asked for three thousand dollars of public money to be used for the installation of free clinic.

There are fifty women among the five hundred students attending the session of the New York college of dentistry.

No time this for quibbling about personal ideas of right and wrong so far as national and international affairs are concerned. It is the plain duty of every American to be an American; and to back up his government in whatever is concluded to be necessary for the public good. Any other course is open to the gravest suspicion.

Dentists over in Massachusetts think that they should not pay taxes on their professional equipment. Would like to hear one of them present the logic of their contention.

The Schenectady, N. Y., free clinic is four years old, has become a recognized institution of the city social service, and its work is highly commended by the public press. The average daily treatments number 25.

Big manufacturing concerns everywhere are installing dental outfits, with licensed dentists paid to conduct clinics for the benefit of employes. In some cases no charge is made; in others simply enough to cover cost of materials used. All reports thus far read indicate that the experiment is a financial success.

Dental clinic opened at Flushing Hospital, N. Y., May 22.

Dr. T. B. Hartzell told the Massachusetts dentists in convention assembled at Boston that the dental profession is responsible for 15% of the bed-ridden hospital cases, through the medium of the improper handling of abscessed teeth. Dr Hartzell asserts that infective material is forced through the apex, enters the circulation, and gets busy. All of which may be true, but still occupies the position of the Scotch verdict—"not proven."

A demand is rising for women assistants in the operating room; not merely maids, but graduated dentists, able to handle any case. Women are recognized as particularly efficient in the handling of children,

The thirty free scholarships in the Evans Museum Dental Institute have been suspended by the Trustees, on the ground that the Board must pay for all free scholarships. Some arrangement for restoring the scholarships seems likely.

Dr. Joseph C. Bloodgood, Johns Hopkins,warns smokers that they should rinse the mouth thoroughly several times each day with a solution of bi-carbonate of soda, as a precaution against the formation of ulcers that may result seriously if neglected. Bi-carbonate of soda, he said, should form part of all tooth powders. He also warned smokers against the use of potash.

Fears for the future of the older dentists were expressed at the New York State convention. One speaker declared that the older men were finding it impossible to compete with recent graduates, owing to improved methods and appliances. Seems to me that the problem might be solved by post-graduate courses for the elderly.

Probably hundreds of oral hygiene talks are delivered every week in public schools throughout the country. If there is a better way to bring the dental profession prominently before the public we haven't heard of it. We still are able to help all who apply with Ms. lecture, clippings, etc. This trifling service costs nothing; busy dentists are quite welcome to it.

Two brothers, John E. and William Robertson, graduates of U. of M., will at once join the Allies in France, devoting their time to the treatment of mouth infections that result from life in the trenches.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVI AUGUST, 1916 No. 8

OFFICIAL ORGAN

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

CHRONIC ORAL INFECTIONS, WITH SUGGESTIONS FOR THE MANAGEMENT OF CASES*

BY ARTHUR D. BLACK, A.M., M.D., D.D.S., CHICAGO.

TO BETTER UNDERSTAND the situation which at present confronts the dental profession in its attitude toward chronic oral infections, it may be well to glance backward to the time of the first organization of the profession, three-quarters of a century ago. For many years the practice of dentistry consisted chiefly of the extraction of teeth and the construction of dentures. This properly might be referred to as the period of mechanical dentistry. The general rule was to extract all teeth which had badly diseased peridental membranes or exposed pulps. It was not at all uncommon to extract many teeth because of decay which had not involved the pulp, and also to extract many which presented neither caries nor disease of their investing tissues, as a part of the procedure of clearing a mouth for dentures. Pulp treatment was not a part of dental practice during this period, although an occasional article on this subject may be found in the literature. Dental pathology was practically an unknown quantity.

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*Read before Cleveland Dental Society, March 6, 1916.

In view of our present knowledge of the systemic effects of chronic focal infections, there seems to be little question but that those people who received the dental treatment of this period must have been, on the average, more free from the secondary systemic effects than our adult patients of today, because the suppurating foci were either prevented or eliminated by extraction. It is quite certain, however, that many persons did suffer from secondary effects of mouth foci, because of the general neglect of the mouth, and the small percentage who applied for dental service.

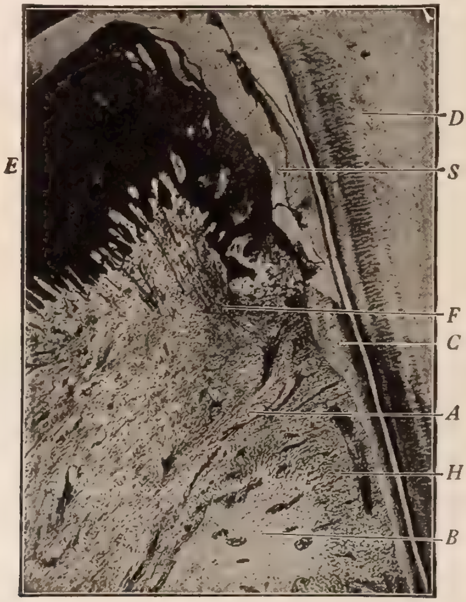


Fig. 1. Longitudinal section through the gingiva and the gingival portion of the peridental membrane. (E) Epithelium. (D) Dentin. (C) Cementum. (S) Subgingival space. (F) Free gingivæ group of fibres. (A) Alveolar crest group of fibres. (H) Horizontal group of fibres. (B) Bone of alveolar process.—*Noyes.*

Beginning about 1860, articles on pulp removal and root filling occurred frequently in the few journals then being published, and it is fair to presume that many practitioners undertook these operations, and that pulp treatment came to be quite generally practiced in the early seventies. It was during this same period that the attention of the profession was called to the treatment of the peridental membrane by the operations of Dr. J. M. Riggs, of Hartford, Conn. It so happened also that Lister, in 1867, announced the effect of phenol in preventing pus formation, and what has come to be known as the antiseptic period in surgery was developed rapidly during the succeeding years. The use of antiseptics by surgeons to control pus formation was later followed by its use in dental practice.

Thus the period of mechanical dentistry gradually gave way to what may be called the period of excessive conservation of the teeth. The dentists' ambition and ideal came to be to save every tooth, almost without regard to its condition. Exposed pulps were capped, suppurating portions of pulps were removed and cappings placed over the remainder, or pulps were destroyed and removed. Chronic alveolar abscesses were treated with powerful antiseptics. In the earlier efforts, root fillings were most generally made of cotton which had been dipped in creosote. Teeth with diseased investing tissues were treated with every known caustic and antiseptic while held in place with mechanical devices, without which many would have fallen out on account of the extensive destruction of their attachments.

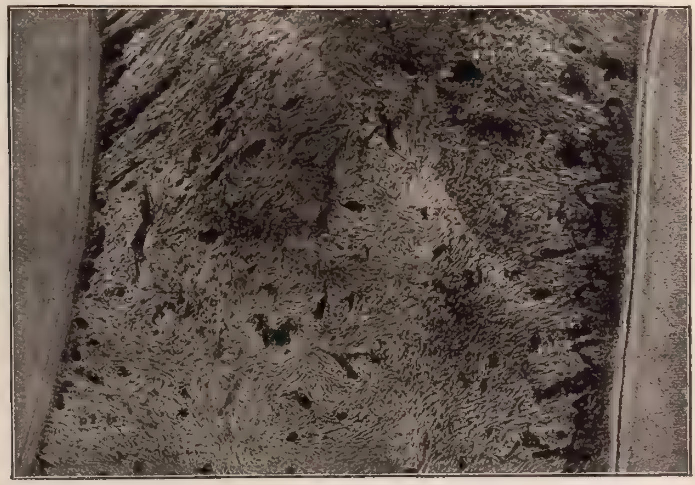


Fig. 2. A portion of the peridental membrane between two incisors of a young sheep showing the trans-septal fibres extending from tooth to tooth.—*Noyes.*

There was during this time the most utter disregard for the investing tissues in both prosthetic and operative procedures. Crowns and bridges almost universally impinged on the gingivæ and kept up constant inflammation. Interproximal tissues were mutilated with separating files and wooden wedges; proximal surfaces were left so that food lodgments would irritate the soft tissues continually. Almost every procedure seemed to invite infection. We might find considerable justification for calling this the period of suppurative dentistry!

There was improvement as years passed in all details of practice. Very slowly studies in dental anatomy, histology and pathology pointed the way toward the development of better technic, to the restoration of more nearly normal tooth forms for the protection of the gingivæ, to the more complete removal of pulp tissue and better root fillings. The caustic remedies and strong antiseptics gradually gave way to milder drugs which were less injurious to the tissues. However, practically the only studies in dental pathology which were utilized by the profession as a basis of practice were those relative to the progress of caries, and those which established the fact that an inflamed pulp would die. The treatment of chronic suppurative pericementitis and of chronic alveolar abscess was empirical—without regard to the pathological changes and the physiological possibilities of repair. The profession has persisted in its endeavor to cure both conditions by medication, notwithstanding the years of accumulated evidence of failure.

A new period in dental practice was born with Hunter's article on Oral Sepsis in the London Lancet in 1911, and the advent of radiography. It is rather remarkable that these two events should have occurred so close together, for it is doubtful if the stir caused by Hunter's lashing of the dental profession would have been effective had not the actual conditions of bone involvement in both alveolar abscess and chronic pericementitis been exposed by the radiograph.

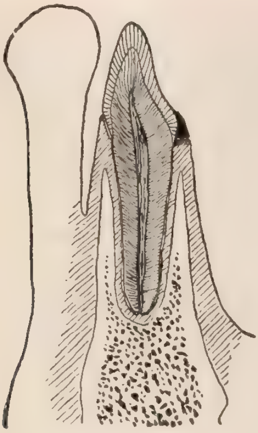


FIG. 3

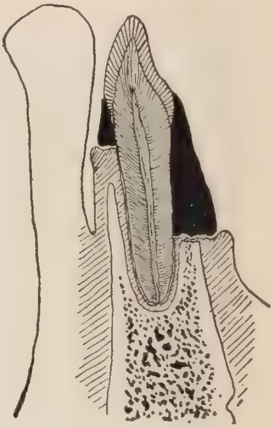


FIG. 4

Fig. 3. Drawing illustrating a slight deposit on the lingual surface of a lower incisor which has caused a gingivitis only, not having progressed far enough to involve the attachment of the peridental membrane to the cementum.

Fig. 4. Drawing illustrating a still greater destruction, including also the labial tissues.

*All illustrations in the article, unless otherwise indicated, are from G. V. Black's Special Dental Pathology.

This new period into which we are passing must be essentially a period of health conservation in dental practice. It must be a period in which both dentist and physician recognize the dental field as a part of the human mechanism; in which a chronic suppuration in the mouth will be regarded as a menace to health which can not be permitted to exist; in which the dentist will take his place alongside the various other medical specialists in conserving the health of those whose mouths are under his care. It must be a period during which physician, dentist and the public will all come to appreciate the fact that we have gone too far in our efforts to save teeth. In pulp treatment there must be changes in technic, in methods, in time required, and corresponding readjustments of fees; the need of all of which must be recognized by the public.

What changes in dental practice are necessary to meet the new conditions, and how are they to be brought about? We must follow the same road which has been followed generally in the advancement of medical practice. We must get away from empiricism and base our treatment on more intimate knowledge of the histology, physical functions and pathological changes in the tissues with which we are concerned. With a full appreciation of the splendid research work which has been and will be done, I would like to emphasize the fact, that there is greater need to-day for the careful digestion and assimilation of that which is already before us than for additional research. Of what benefit will it be, if our research workers solve other problems, unless we modify our practice in accordance with their findings, the truth of which shall have been established sufficiently well?

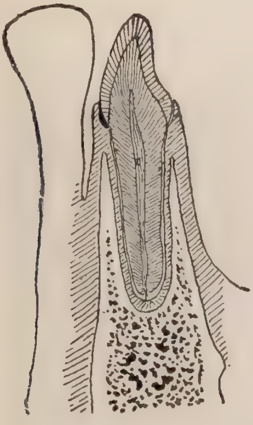


FIG. 5

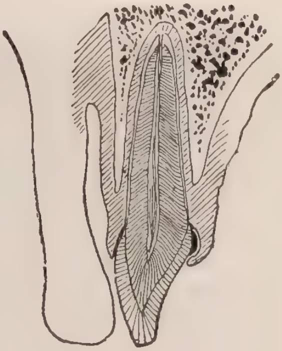


FIG. 6

Fig. 5. Drawing illustrating a deposit of serumal calculus under the free gingiva on the labial surface of the enamel of a lower incisor tooth.

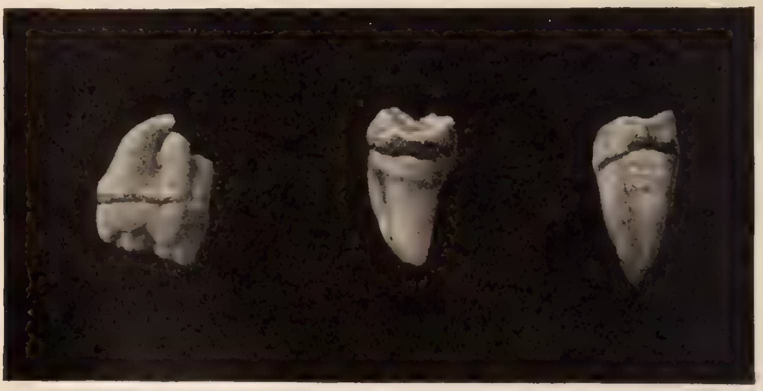
Fig. 6. Drawing illustrating a similar deposit on the lingual surface of an upper incisor. Suppuration of the peridental membrane, resulting from deposits in this position, causes the teeth to move labially, and such cases are generally hopeless, after much progress has been made.

I believe, there are few today who would dispute the general propositions announced as a result of the studies of dental caries upon which the treatment by "extension for prevention" in cavity preparation is based. These propositions were stated as clearly more than twenty years ago as they ever have been since, and yet how many members of the profession today recognize the clinical phenomena, and really practice extension for prevention? The more important facts relative to the shrinkage and expansion of amalgam have been stated again and again in our literature during the last twenty years, and yet what proportion of dentists are using high grade alloys which will not shrink? The answers to these questions are none too encouraging when we today are facing a problem which calls for radical changes in general plans of operating and much improvement in technic. It means that those who are interested seriously in the development of better dental service must be untiring in their efforts to stimulate others.

Stated in their simplest form, the problems in pathology which concern us in this presentation are as follows:

First: Certain systemic effects are now generally recognized as being secondary to chronic infective foci. These effects include a considerable number of serious conditions, such as arthritis, nephritis, myocarditis, ulcers of the stomach, appendicitis, cholecystitis, etc.

Second: It has been shown quite conclusively by Rosenow and others that the transmission from the primary focus is generally by the circulation. Therefore the particular location of the chronic focus in relation to the tissue secondarily involved is immaterial.



Figs. 7, 8, 9. Three molar teeth showing "rings" of deposits of serumal calculus on the enamel of the subgingival space. Frequently these "rings" encircle the crown. Specimens from Northwestern University Dental Museum.

Third: The most important factors in the primary focus are the conditions which afford the opportunity for bacterial growth, and for the entrance of these organisms into the circulation.

Fourth: In the mouth there are three groups of chronic foci: (a) Deposits of salivary calculus, with which may be included certain fillings, crowns, bridges, etc., which impinge on the gingivæ and keep them in a state of constant low-grade inflammation; (2) pus pockets alongside the roots; (3) chronic alveolar abscess.

We have in each of these a source of practically constant irritation which maintains a field for infection by the pyogenic organisms ever present in the mouth, with ample opportunity for contamination of the blood stream. In the case of deposits of salivary calculus, there is a shelf of granulation tissue in contact with the deposit; in the pus pocket alongside the root the overlying tissue will constantly or intermittently present a similar granulating surface, as will the tissue about the root apex in the case of the chronic alveolar abscess. In each instance, the thin-walled blood vessels in the newly-formed granulations offer little resistance to the ingress of micro-organisms and the products of their action.

Fifth: We therefore have in the mouth these three groups of conditions which are a menace to health, and their prevention or elimination must have serious consideration. To this end we need to understand the structure and functions of the investing tissues of the teeth in their normal state and their pathological changes.

It is not within the scope of this paper to do more than call attention to certain of the more important features. A careful microscopical examination of the gingivæ shows them to consist of a very dense pavement epithelium, supported by a connective tissue which sends many finger-like projections into the epithelium, furnishing a rich blood supply. We find every possible provision by which the gingivæ are enabled to withstand much severe punishment and still protect both the underlying peridental membrane and the teeth which they encompass.

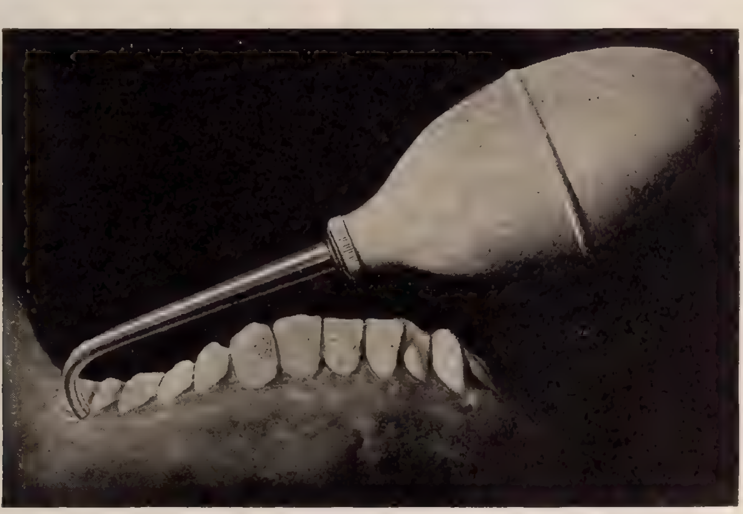
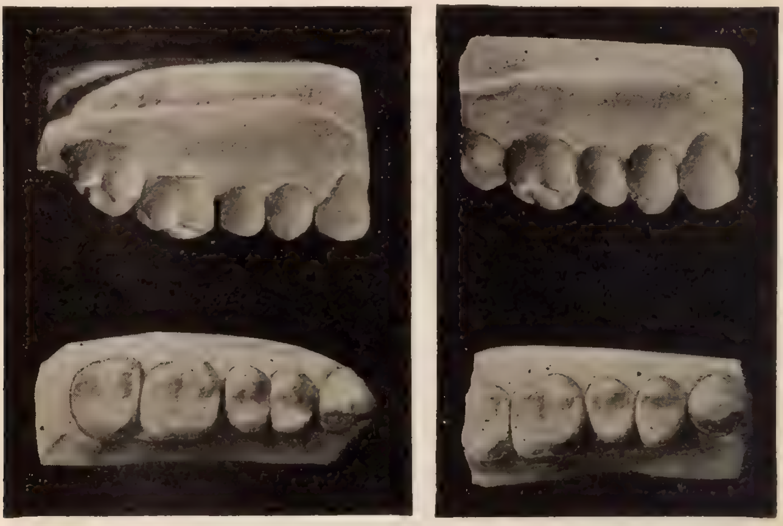


Fig. 10. The position of the rubber bulb syringe in washing the subgingival spaces or pus pockets. The end of the nozzle should touch the enamel of the tooth near the crest of the gingivæ as it is passed along the arch, the angle being such that the water or solution will be forced into the subgingival spaces. This is the most effective means of preventing deposits of serumal calculus.

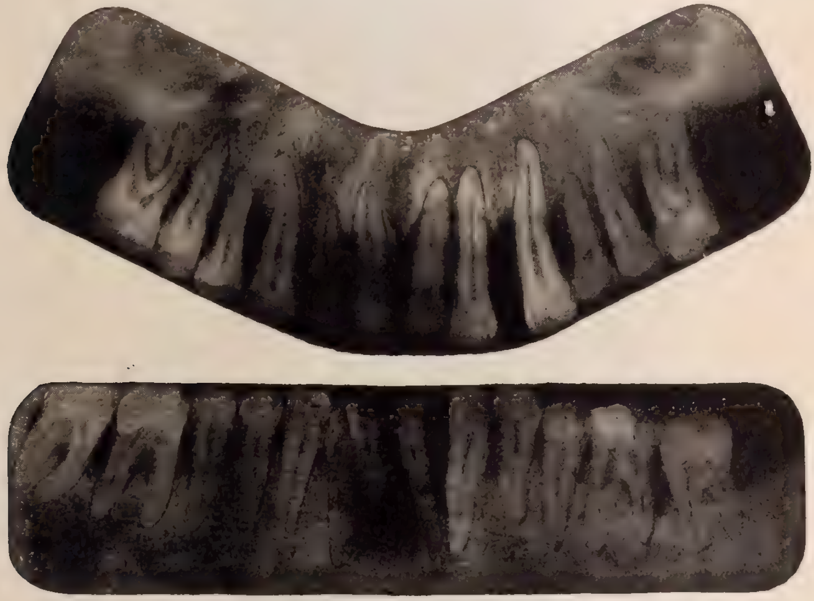
The peridental membrane presents several specialized elements; most important of these are the groups of principal fibres and the cementoblasts. In addition to the groups of fibres which connect the root with the bone of the alveolar process, there is one group of fibres which encircles each tooth and passes occlusally into the gingivæ. These fibres have been named the "free gingivæ group," because they help to support the gingivæ and assist in maintaining their close adaptation to the teeth. If the fibres of this group should be cut away from the cementum by suppuration, we would expect the close adaptation of the free gingivæ about the crown to be lost. There is another very important group of fibres called the "trans-septal group," passing across each interproximal space over the bony septum, connecting the proximal surfaces of the teeth. The principal function of these groups, between the various teeth, is to hold the teeth in contact. When a suppuration cuts off these fibres, we should not expect the contact to remain tight. An understanding of the structure and function of the fibres of this group, and the conditions resulting from their detachment, not only explains many failures of attempts to restore and maintain contacts, but also serves to impress the importance of preventing such detachments from occurring.



Figs. 11, 12. Photographs of plaster models of a case before and after contact restoration. The patient presented with a slight pocket on the mesial surface of the root of the first molar on account of the open contact. The mesial surface of the first molar and distal of the second bicuspid were free from decay and had not been filled. The separation had occurred as a result of flat fillings in the mesial of the second bicuspid and distal of the first bicuspid. These fillings were removed, and a Perry separator was applied on several occasions to move the second bicuspid back into contact with the first molar, it being held there for a time with fillings of base-plate gutta-percha. Later, permanent fillings were made, restoring normal conditions, as shown in Fig. 12. It was necessary to relieve the occlusion on the distal slopes of the cusps of the second bicuspid as it was moved.

The function of the cementoblasts is to build cementum. They lie on the surface of the cementum between the ends of the fibres of the peridental membrane, as do the osteoblasts on the surface of bone. However, there is the important difference between cementum and bone that cementum has no circulation of blood and can not repair itself nor exfoliate a dead portion, as can bone.

The physiological relationship between the tooth and its peridental membrane and alveolar process is important in the study of disease involving those tissues. The peridental membrane and alveolar process are to be considered as dependencies of the tooth. They come into existence with the development of the tooth and disappear following its extraction. Therefore, whenever there is a detachment of the peridental membrane from the cementum, which detachment is maintained, as in the case of a suppurative detachment, we should expect the detached fibres, as well as the corresponding area of bone, to disappear by absorption.



Figs. 13, 14. Panoramic radiographic views of the upper and lower jaws in a case of chronic suppurative pericementitis of long standing. This patient had suffered from gout for five years. The right foot was first swollen and was very painful. In subsequent attacks the ankle was involved. The patient stated that except for this, he had never been sick a day. One lower incisor had become so loose that it was removed with the fingers. Pressure upon the gums caused pus to exude about the necks of many of the teeth. It was advised that all of the teeth be extracted.

Having in mind the structural elements and their functions, let us look for a moment at the changes which occur when these tissues become diseased. We have stated that there are three groups of chronic foci in the mouth. It is important that we understand why these are chronic foci. What factors are conducive to the chronicity of each? What changes occur in the tissues? How may the circulation become involved and thus endanger the health of distant tissues? What may we do either to eliminate the focus, or to reduce the menace to the health to the minimum?

Disease of the peridental membrane practically does not occur except as a result of a preceding gingivitis or the death of a pulp. In the one case the first involvement of the peridental membrane is at the gingival line, in the other it is at the apex of the root. There are two types of disease beginning at the gingival line which present very different pathological pictures: the one caused by deposits of salivary calculus, in which there is little tendency to the formation of pus pockets; the other caused by deposits of serumal calculus on the enamel under the free gingivæ, or by injuries, in which there is a marked tendency to pus-pocket formation.

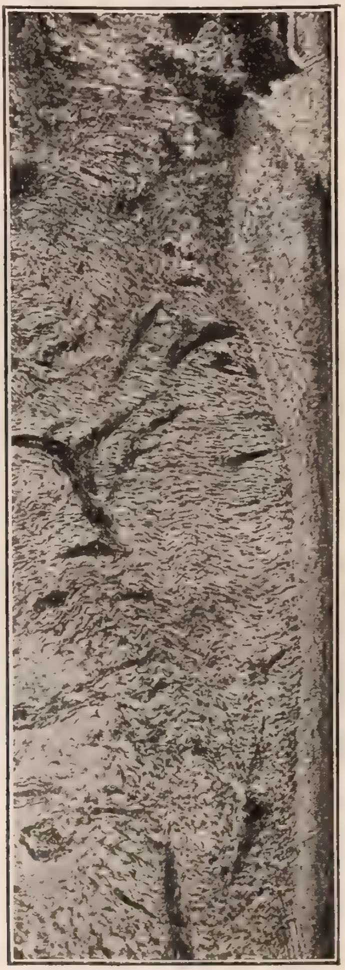


Fig. 15. Normal peridental membrane. The row of cementoblasts may be seen lying along the surface of the cementum. These cells occupy most of the space between the fibers as the latter enter the cementum. Photograph by Dr. F. B. Noyes.

In the case of inflammations caused by deposits of salivary calculus, there is a gradual destruction of all of the investing tissues, including the bone, as the deposit increases. The removal of the deposit exposes a shelf of granulation tissue, standing at right angles to the surface of the tooth.

It is this shelf of granulation tissue, and the opportunity afforded for microorganisms to grow there and to enter the circulation, which is the menace to health. As a rule the peridental membrane is attached to the root to the level of the shelf and, as has been stated, there is little tendency to the formation of a pus-pocket alongside of the root. Therefore, if the irritation—the deposit—is removed, the granulation tissue will disappear within a day or two and the menace to the health is eradicated. It is then a question of preventing a recurrence of the deposit.

Recent investigations have pointed the way to very simple but thoroughly dependable procedures for preventing deposits of salivary calculus. These deposits are so soft for fifteen or twenty hours after they are first laid down that they can be removed easily by a brush and plain water, but later become so hard as to be difficult or impossible to remove with the brush. Therefore, it is quite possible for each person entirely to prevent these deposits by careful brushing twice daily. It becomes merely a question of gaining the interest of the patient to exercise this care.

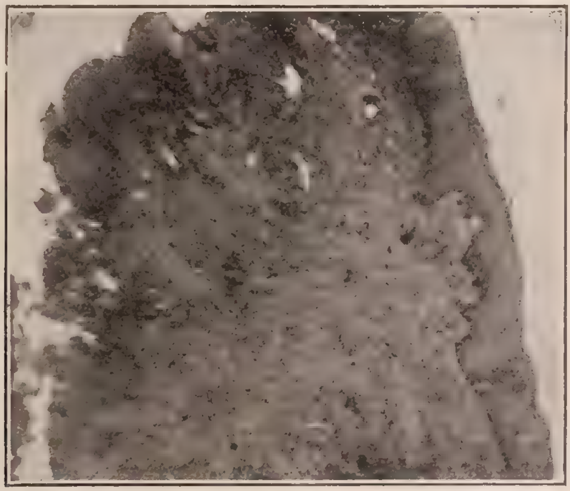


Fig. 16. Section through soft tissue overlying a deep pocket of many years' standing on the labial side of the root of a lower left cuspid; from about the middle of the length of the root. Patient sixty-five years of age. Tissue cut away by Dr. Arthur D. Black on September 29, 1913. Normally the crest of the alveolar process should be present in a section cut in this position. The bone has all disappeared, as have practically all of the fibers of the peridental membrane. Section prepared by Dr. H. A. Potts, photographed by Dr. F. B. Noyes.

In those cases in which pus pockets are formed alongside the roots, the changes are more complicated. The original gingivitis may be caused by almost any condition which results in continual or intermittent irritation, such as the deposit of serumal calculus on the enamel of the subgingival space; an open contact which permits the impaction of food, a broad or rough contact which catches food particles, irregularities of position of the teeth, etc. The essential point of connection between the gingivitis and the pus pocket is that the irritated gingivæ present the opportunity for invasion by the pyogenic organisms of the mouth, which means that sooner or later a suppuration starting within the gingivæ is likely to involve the peridental membrane.

The effect of such a suppuration is to detach the peridental membrane from the cementum. This detachment is in effect a stripping of the soft tissue from the surface of the root. Apparently, at the time of the detachment, the cementoblasts are destroyed, and subsequently the detached fibres of the membrane disappear. Later the portion of the bone of the alveolar process to which these fibres were attached also disappears. It seems likely that the disappearance of these fibres and the bone is largely a physiological process.

These changes do not occur rapidly. The process is essentially a slow one. Several years usually will elapse between the original gingivitis and the formation of a pocket of a few millimeters depth. During the process of the formation of the pocket, the denuded cementum is bathed in pus and the products of the decompositions which often occur. This portion of the cementum becomes a dead and infected tissue. It is closely analogous to a piece of necrosed bone which may not be exfoliated. Overlying this cementum is a granulating surface of connective tissue containing its thin-walled blood vessels, which afford opportunity for the contents of the pocket to enter the circulation. Here is a serious menace to health which must be eliminated.

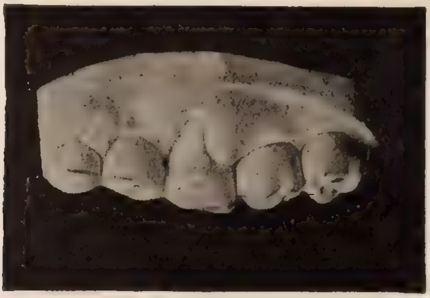


Fig. 17. Plaster model of case in which the tissue overlying a pocket on the mesio-buccal root of an upper first molar was cut away to reduce the depth of the pocket and facilitate the cleaning.

What is the prospect for a reattachment to the root? The cementoblasts are gone, the fibres of the peridental membrane are gone, the bone of the process is gone, the cementum is negatively chemotactic to any tissue attachment. With these facts before us, have we any right to expect the closure of such a pocket by reattachment of the peridental membrane? Is it not very plainly a physiological impossibility?

How may the systemic danger be eliminated? Certainly by extracting the tooth; possibly by other means—sometimes by cutting away the overlying soft tissue. If the pocket is to remain there must be some effective means of keeping it clean, so that pus will not be formed and decompositions will not occur within. This may be accomplished in many cases by training the patient to practice twice daily irrigation of the pockets, with a large rubber bulb syringe and normal salt solution. Nothing in the line of medication has been comparable with this in cases under the writer's observation. So long as these pockets are kept clean, they are safe, and in cases in which the patient learns the simple technic and carries it out faithfully, pockets have seemingly been kept free from suppuration continuously for years. This statement should not be taken to mean that all pockets may be kept free from suppuration by irrigation. Naturally the difficulty of cleansing increases with the depth of the pocket.

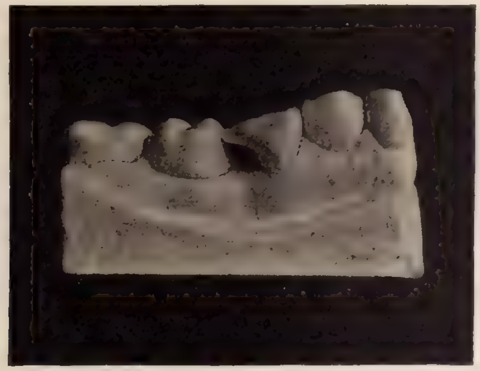


Fig. 18. A case in which the distal root of a lower first molar was amputated. The distal half of the crown of the tooth was also cut away, and a gold crown was made to restore the full occlusal surface.

In those cases in which a chronic alveolar abscess follows the death of the pulp, we have a very similar pathological picture. The peridental membrane is stripped from the cementum of the root end, and in cases of long standing is destroyed entirely. The bone to which it was attached is destroyed also, and the denuded root-end stands free within a hole in the bone. This cavity usually is infected, and the cementum is pus-soaked. The walls of the cavity present the opportunity for its contents to enter the circulation.

Again we have conditions which preclude the possibility of reattachment of tissue to the root-end. The menace to health demands the elimination of this focus. It seems clear that the root-end must be removed either by resection or by extracting the tooth, and there is no middle-ground which is safe. We have no other alternative once the root-end is denuded. Our alternative for the future must be the prevention of abscess formation in a larger percentage of cases.

While much is yet to be learned of the pathology and bacteriology of both the pus pocket alongside the root and the chronic alveolar abscess, one fact stands out prominently over and above everything else, viz., that the physiological possibility of reattachment of tissue to the root is practically nil, and we must face the situation squarely and direct our treatment accordingly.

No single tooth, no full set of teeth is of sufficient value for mastication, or appearance, or both, to justify the retention of the tooth or teeth if they are a menace to the health of the individual. If the dental profession is to take and maintain its position as a branch of the healing art, it must do its full duty in eliminating these mouth foci. It must do more than this; it must, by improved technic, by better asepsis in pulp treatment, by every means at its command, strive to prevent and succeed in preventing a large number of these conditions. It seems unquestioned that the mouth contains a larger number of chronic foci than any other region. Mouth conditions must therefore be responsible for the largest number of the secondary systemic effects. Could there be a greater opportunity before a profession than that of preventing these secondary effects by eliminating their source? Will we rise to our opportunity?

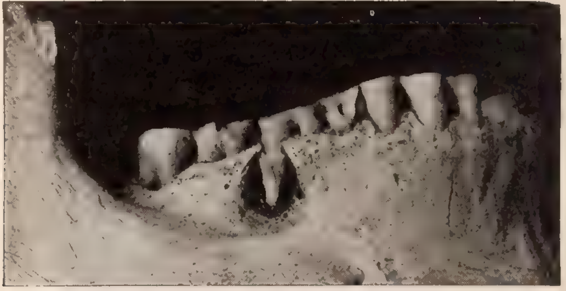


Fig. 19. Lower jaw of a Flat-Head Indian from Columbia River, Oregon, showing destruction of bone by a chronic alveolar abscess about the distal root of the first molar. The bone about the first molar of the opposite side is in practically the same condition. This is typical of the injury which occurs.

DISCUSSION

Dr. W. H. Whitslar: Our distinguished guest brings to us tonight an unqualified epitome of the terminations of the teeth due to neglect, and the secondary consequences which may prove serious if not fatal.

I cannot help but believe every word Dr. Black has uttered, for, like unto his father, we have learned that when a subject is dealt with it is completed when the last sentence is pronounced. Therefore, I have no objection to the conclusions which are so highly drawn from pathological experience. We learn, however, that clinical experience is sometimes deceiving in that it presents phenomena that cannot be dissected or analyzed. I refer to the vital relationships that make Life triumphant and virulence inactive.

In order to understand the view-point I wish to present, let us consider some of those conditions which will illustrate the argument.

Pathology teaches that tuberculosis will break down lung tissue and cavities being formed by this caseation the lung is incapacitated; but, these cavities are arrested sometimes by being surrounded by a capsule of fibrous tissue which will enable the patient to continue to live. I know a very strong, healthy-looking man of 200 pounds in weight, whose breathing capacity is limited practically to one lung.

Abscesses occur in the liver, that very important organ which receives the blood from the digestive tract for functional purposes, and supplies blood to the walls of the blood-vessles and inter-lobular connective tissues. The pus of these abscesses may be resorbed and the abscess encapsuled or a cicatrix formed. Practically all cases of abscess of the liver are due to action of micro-organisms either through the circulation, penetrating wounds, perforations from gastric or duodenal ulcers, or invasion along the bile-ducts.

In the pelvis of the kidney we find frequently calcareous formations produced by a precipitation of normal or abnormal constituents of the urine. The results of renal calculi may be trivial or serious. In a like manner incrustations of calcic matter may form in the bladder, and broken catheters and hair-pins have been found completely covered with calcareous matter to protect, as it were, the walls of the bladder.

The stomach, that receiver of all the garbage that domestic and foreign chefs can inflict upon us, is subject to various forms of inflammation. As a consequence of lowered vitality ulcers may form from which perforation and hemorrhage are the greatest dangers. Perforation of the posterior wall of the stomach may cause abscesses of the liver, spleen or pancreas. Ulcers may heal and form scars, or pyloris stenosis, dilatation or interstitial gastritis may ensue.

My last reference for the purpose of comparison is endocarditis. Endocarditis is practically, though not always, a secondary process due to micro-organisms. It is possible that toxic substances resulting from improper metabolism may act upon the endocardium. These irritations may produce a fibrinous coating upon the valves of the heart and result in ulcerations. The greatest danger from endocarditis is when some material from these infected areas breaks away and is carried to the lungs, liver, and kidneys, and, acting as an embolus, cuts off the circulation, which you know is a serious matter. Post mortem evidences show the location of these ulcers by scars and also calcareous masses which may take their place.

There is no doubt that these conditions are frequently observed by the practitioner, but it does not imply that the heart, lungs, liver or kidneys should be excavated or amputated.

Now, I have called attention to some of the diseases which produce the most of the deaths in the United States, and have referred incidentally to the wonderful kindness of nature in attempting to correct these ills.

Pathology is a picture of these conditions but clinical experiences have indicated that toleration, or regeneration of tissues may be a substitution for the original ones. Epidermic structures are not so susceptible of reconstruction as the mesodermic because of less circulating fluids, hence when the mesodermic derivative, i.e. the peridental membrane, becomes destroyed by *external* encroachment its regeneration is impossible as indicated by Dr. Black.

In the apical abscess the condition is different. Circulating media are the carriers of pabulum to feed the surrounding tissues, and, phagocytes wall in the infective debris, providing resolution does not take place. The formation of this dam of maetrial is known as a pyogenic sac, and is attached to the root of the tooth. It is circumscribed and not destructive of tissues about it; therefore, is it not comparable to the ulcerations and abscesses of the heart, lungs and kidneys to which I have already alluded? Indeed its presence sometimes cannot be detected excepting with the extraction of the tooth; a radiograph does not reveal it. A radiograph does reveal the shadow or opacity which we call an abscess, but can it designate a benign abscess, or one that is acute, and that the virulent media is being cast into the blood stream producing thereby deplorable results?

That micro-organisms infect remote organs by being carried in the blood-stream has been known for years previous to the announcement of Rosenow. Alfred Stengle in his text-book on Pathology published in 1903 made frequent reference to this fact, and there is no escape from the scientific truth that fatal results are obtained in this manner.

The question I wish to submit is this: "Is this a death sentence, each and every time we observe with a radiograph an abscess area?"

Will the profession endorse this, or commute the sentence?

The one means a return, in part, to ancestral limitations, the other to a defense by a constructive policy which does not include necessarily empirical methods.

There is more truth than poetry in Dr. Black's assertion that there is greater need of careful digestion and assimilation of that which is before us than for additional research; but, I will qualify that, and add that continuous research is both necessary and profitable, and, because dentists do not avail themselves of these opportunities, their professional fitness is limited and is liable to deterioration. The public needs to fear the laxity of the unfit and also the extremist who declares that the teeth are galloping the human race to extermination.

Is there a middle-ground that holds judgment a superior virtue and acts advisedly? Let us prove to the medical profession that our judgment in dentistry is superior and that we are better qualified to read radiographs and to act advisedly regarding the retention of teeth rather than their ruthless extraction.

Now, Mr. President, Dr. Black has not advocated that we return to the days of early dentistry, but the medical fraternity is in some places doing this very thing, and my fear is that for lack of the number of dentists who have the brains and stamina to practice intelligently, the human race must suffer correspondingly. Heart disease and endocarditis have increased in the last two years, the deaths in 1913 being 93,142 in the United States while deaths from tuberculosis have decreased.

What percentage of deaths do you believe were the outcome of diseased teeth?

AMALGAM RESTORATIONS*

BY J. A. DINWIDDIE, D.D.S., LOWELL, IND.

My plea is not to make an amalgam filling, but to make an amalgam restoration; to restore the broken-down tooth to as nearly as possible the original form, thereby protecting the gum septum in the interproximal space, lessening the tendency to pyorrhea pockets, restoring proximal contact, all marginal ridges, sulci and cusps on the occlusal surface, thereby giving greater masticating area; not the flat contact or no contact, and only a flat surface on the occlusal.

This work is divided into the following steps:

First: Prepare all cavities with flat base; extend margins; Black cavity preparation.

Second: Compound cavities; always use a matrix and some method of restoring contact point. I prefer Crandall's.

Third: Use a non-shrinking alloy; Crandall's preferred.

Fourth: Properly mix and properly condense.

Fifth: Carve to occlusion, and polish at another sitting.

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*Clinic Indiana State Dental Society, 1916.

> I do the very best I know how—the very best I can do; and I mean to keep doing so until the end. If the end brings me out all right, what is said against me won't amount to anything. If the end brings me out wrong, ten angels swearing I was right would make no difference.—*Abraham Lincoln.*

REFLEX DISTURBANCES IN RELATION TO DENTITION*

BY EDWARD C. KIRK, D.D.S., SC.D., , L.L.D., PHILADELPHIA, PA.

THOSE WHOSE INCLINATIONS PROMPT THEM to the historical study of dental literature cannot fail to have been struck by the confusion of ideas and multitude of opinions therein recorded with respect to the subject of dentition. From Hippocrates, who devoted one of his books to the subject, down to comparatively recent times, the proruption of the teeth in the evolution of the dentures has been more or less shrouded in mystery. In the earlier periods of the development of medical knowledge superstition, the offspring of ignorance, obscured the problem with an almost endless collection of fantastic explanations of the phenomena of dentition, and attributed to the process the most impossible relations of cause and effect. Many of these antiquated superstitions still survive among the laity, and not a little of the original ignorance concerning the anatomy, physiology and pathology of the process also survives among those whose training as exponents of the science and art of healing should have eliminated it.

If other subjects pertaining to bodily health and welfare have been more voluminously treated, certainly none has been more continuously discussed in medical and dental literature, for the record of the study of dentition runs back to the earliest known medical writings, and that I believe the question to be still open for debate is my warrant for inviting your attention to the subject this evening.

Broadly speaking, two general points of view with respect to the problem of dentition are manifest in discussions of the subject—first, that promulgated and defended by those who hold that dentition is a physiological process, and being such, produces no pathological phenomena, that there are no "accidents of dentition" as the French writers express it, and, second, those who concede that dentition is normally a physiological process, but like parturition, which is normally physiological, it may become, under certain circumstances, pathological, even fatally so, for even as women die in childbirth, so also children die from pathological dentition.

It is interesting to note that the recorded contentions of those who view dentition exclusively as a physiological process, in the great majority of instances betray complete ignorance of the essential anatomical and physiological factors involved therein, and they also limit their discussion exclusively to the evolution of the deciduous denture. In illustration of this group of writers, let me cite the following quotations from Diseases of the

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*Read before the Cincinnati Dental Society, February, 1916.

Mouth in Children (Non-Surgical) by Forchheimer.† In the chapter on Dentition, page 154, he says, "In teaching, I have for years, put down for my students an axiom that 'teething produces teeth and nothing more'." And he says in further explanation, "While theoretical considerations cause us to deviate slightly from this position, it will be found that the more acute the diagnostician, the more accurate and searching the examination, the nearer the truth this statement." That he has failed to grasp the anatomical relationships and the disturbance of physiologic harmony involved in pathological dentition is manifest when he says concerning gum lancing, which, in passing, it is significant to note he designates as "Scarification", "The idea that tension within the sac is relieved is a purely imaginative one. There is not tension within the sac, and as has been shown, there is more than enough room for the tooth; so that under normal circumstances pressure within the sac or upon its bony surroundings, in all directions, becomes an anatomical impossibility. Under normal conditions lancing of the gums has no effect upon the condition within the tooth sac."

He further says: "In more or less general terms it has been stated that irritation of the nerves is produced by the tooth. The mucous membrane above the tooth has its nerves atrophied as a result of constant pressure; in other directions no nerves are pressed upon; how, then, can gum lancing relieve a thing which does not exist?"

Let me add one other quotation to complete the picture. The distinguished author states at page 163 of the work in question, "In my whole experience I have lanced the gums once; then at the earnest solicitation of a consultant. The result was *nil*, and in all other cases that I have seen in the practice of other practitioners the result was the same."

The teaching here quoted has been widely accepted as sound doctrine by medical men, and has been quoted largely by pediatric writers. Opposed to this view is a large body of writers who from a rational understanding of the anatomical relations involved, and others who from empirical observation, have secured prompt abatement of distressing symptoms in difficult dentition through intelligent use of the gum lancet. There has thus been accumulated a mass of clinical evidence and an array of facts bearing upon pathological dentition that cannot be set aside without due consideration and explanation.

A fundamental difficulty, which has served to obscure the solution of the problem of pathological dentition, has been our failure to grasp the extent and scope of the process of dentition as a whole, and our tendency to limit our study to its phenomena as these are manifested in the evolution of the deciduous denture, whereas dentition, broadly considered, covers the whole process of dental evolution, beginning during the early weeks of intrauterine life and proceeding without interruption until the third molars of the permanent denture assume their normal position and function about the eighteenth year.

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†J. B. Lippincott Company, Philadelphia, 1892.

The literature of both dentistry and medicine is reasonably full or reports of cases of dental reflex irritation, and so varied are these that one is almost led to conclude that every disorder in the category of human ailments, as the late Dr. Oliver Wendell Holmes expressed it "from ague to zoster" has, at one time or another, had ascribed to it a dental origin. In the case of teething infants, so many disorders incident to that period have had pathological dentition assigned as their exciting cause, that one is compelled to sympathize somewhat with the physician who, lacking a proper knowledge of the nervous and anatomical factors involved, seeks elsewhere than the teeth for his diagnostic data, and accepts the axiom that "teething produces teeth and nothing more."

It is theoretically possible that pressure of the advancing tooth-crown upon the overlying gum-tissue, especially if the latter be dense and resisting, may act as a local irritant to the gum-tissue, producing a traumatic inflammation with tenderness, swelling and tumefaction, which in a delicately organized infant may be productive of harm. But such local manifestations in the overlying gum-tissue are of distinctly minor importance, as compared to the nervous irritation produced by backward impingement and pressure of the developing tooth-root upon the formative organ of the tooth, the dentinal papilla. Concerning this source of irritation, the late Dr. James W. White in his classic article on "Diseases Incident to the First Dentition,‡ says, "The direct pressure of the advancing teeth upon the fibrous integuments is not the only nor the principal factor in disturbance of equilibrium in pathological dentition."

"The most serious complications are, it is reasonable to suppose, caused by the resistance of the gums, and consequent pressure upon the nervous and vascular supply of the pulp, giving rise to severe and unremitting pain—a true toothache, comparable only to that exquisite torture which is experienced in after life from an exposed and irritated pulp. * * * * * * If such a perversion of this physiological process is possible, there can be no question as to the extent of the mischief which may result, and irritability of the general system which finds expression in loss of appetite, sleeplessness, nausea, thirst, fever, diarrhea or constipation, convulsions, paralysis and other serious lesions; many of which, as strabismus or epilepsy, remain through life."

"It is not surprising that those who hold the theory generally assumed and taught, that direct pressure of the advancing tooth upon the fibrous tissue is the explanation of all symptoms attributable to pathological dentition, should underrate the distress and danger which may occur. But the severity of the disturbance frequently witnessed suggests a more serious complication, and a consideration of the conditions justifies a graver diagnosis.

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‡American System of Dentistry, Edited by W. F. Litch, Vol. III, p. 326.

It must be remembered that at the period of eruption the roots of the teeth are yet incomplete. Instead of the conical termination and minute foramen which characterize a perfect tooth, the aperture is nearly as large as the root itself, and thus when the sensitive pulp, made up of connective tissue, blood vessels and nerves, is in a condition of irritation because of the morbid activity of the process of dentition—augmented vascular and nervous action—there may be produced a hyperemia sufficient, possibly, to cause the protrusion of a part of the mass from the incomplete aperture of the root, giving abundant cause for extreme constitutional disturbance.

If in the adult the irritation of a dental nerve may give rise to otalgia, otorrhea, deafness, amaurosis, hemicrania, neuralgia, hysteria, chorea, epilepsy, tetanus, etc., it is surely not only possible, but highly probable that like irritation may be the occasion of grave and even fatal disorders in the infant."

Those who have a clear conception of the involved anatomical relationships and have had opportunity from clinical experience to witness the oftentimes miraculous results which follow intelligent and skillful use of the gum lancet, will regard the foregoing statements by Dr. White as sound orthodox doctrine.

It seems reasonably certain that those who hold to the belief that "teething produces teeth and mothing more" have failed to understand that physiological dentition depends, among other things, upon harmony in the rate of resorption of the overlying gum-tissue and the rate of development of the tooth-root, for where these two processes fail to coordinate, and root development proceeds more rapidly than the resorption of the gum-tissue, the eruption of the tooth is correspondingly impeded and the growing root-end, with its sharp chisel-like edges, is forced backward into the substance of the dentinal papilla. The condition thus produced is mechanically and pathologically analogous to an ingrowing toe nail, where the nail, by reason of the pressure of an ill-fitting shoe, is caused to grow into its formative matrix.

In the infant whose nervous organization is undergoing development, and whose inhibitive nervous control is subordinate to the more highly developed activities of the spinal system, peripheral irritations are more prone to disturb the nervous equilibrium, and to develop reflex phenomena of a more pronounced or acute character than corresponding irritations in the adult. And when it is considered that the ingestion of irritating substances, like orange peel, raisins, fruit seeds, etc., not only provoke the reflex act of vomiting, but in not a few instances have been known to cause convulsions in infants, it is fair to ask why the irritation caused by the backward pressure of the developing tooth-root upon one or a group of dentinal papillæ, would not be a sufficient source of peripheral irritation to produce convulsions, or to set up reflex disturbances in the organs of special sense, of digestion, or of any of the many organs and tissues having nervous connections with the great trigeminus.

I shall not attempt to elaborate this elementary point further, because it seems to me, that the mere statement of the case presents the issue as a self-evident proposition, one which, I may add, is abundantly corroborated by clinical evidence. In the study of the protean manifestations of pathological dentition we are confronted with the fact that they vary both as to intensity and as to kind or character. Broadly speaking, the intensity of the reaction is proportional to the degree of irritation, whereas the character of the reaction is conditioned by the nervous connection involved, the type of individual in which this reflex is manifested.

Any one who has examined the skull of a child about five years of age, in which the outer cortical and alveolar plates have been removed so as to expose the developing teeth, must have been struck with the tremendous amount of dental activity manifestly in progress at that period Radiographs of the jaws from infancy to the eighteenth year show this same activity proceeding with varying degrees of intensity. At the fifth year both dentures, the deciduous and the permanent, an armament of fifty-six teeth, are normally represented in every stage of development; each or any of these may become a source of terminal irritation to the fifth cranial nerve. The period of human development up to the fifth year is thus seen to be a period of intense dental activity from the purely physiological point of view. It is a period in which much dental work in a developmental sense is being done in close connection with, and largely under the influence of the most important of the cranial nerves, through the motor, sensory, glandular, sympathetic and special sense connections, of which the dentitional process is in intimate relations with the principal activities of the entire organism, and upon which it may exert a profound modifying influence, or per contra the dentitional process may be itself in like manner influenced thereby.

Because of the intense dental activity manifest at the period of development under consideration, characterized as it is by increased vascular action and nervous excitement incident to the work being done in the development of the teeth, their eruption and alignment, the organism is under a definite physiological stress which justifies the dictum of Dr. White that "dentition is an anatomical and physiological crisis of infancy" analogous to the other developmental crises of puberty and the menopause.

It is, therefore, easy to understand, that when the physiological process of dentition is disturbed in such a way as to interfere with the normal evolution of the individual teeth or of the denture as a whole, the normal stress of the process becomes intensified to a degree that causes the organism to react pathologically, and there is thus set up a condition of disease.

In the infant the irritations of abnormal dentition tend to express themselves in more acute and intense form than in the adult, which is what one would anticipate from the relatively unstable character of the nervous system of the infant, as compared with the nervous system of the adult. Moreover, the disturbances of the nervous system of the infant are more directly associated with irritations of the dentinal papilla or tooth pulp than in the case of the adult, for obvious anatomical reasons already referred to. Impeded eruption may cause irritation not only of the dentinal papilla by backward pressure of the root, but irritation of the nerve endings in the investing membrane of the root; both sources of peripheral dental irritation may cause marked reflex disturbance, though in the case of infants those irritations arising in connection with root pressure upon the formative papilla are, generally speaking, the source of more acute and intense reflex phenomena. In the adult peripheral dental irritation from impeded eruption arises more commonly in connection with the nerve endings in the pericemental ligament, though in the case of the third molars, because of their late root development, pulp irritations may also be a factor.

Thus far, I have dealt with the underlying principles of the problem of pathological dentition, and only in so far as I have felt justified in believing that the principles in question have been clearly made out. I purposely have avoided discussion of the problem of the nervous mechanism by which peripheral dental irritation is productive of reflex phenomena, for the reason that I am unable to find that the anatomists have as yet sufficiently clarified that phase of the matter, or have afforded us a sufficiently definite explanation for it upon the basis of the nervous mechanism concerned in its manifestation.

Clinical observation, upon which for the present we must mainly depend until the anatomists have given us a comprehensive understanding of the nervous mechanism involved, furnishes abundant evidence of the fact that a wide range of reflex neuroses and other morbid phenomena have their origin in peripheral dental nerve irritation, and that these irritations may be either septic or physical or both combined.

The literature of both medicine and dentistry is replete with reports of cases of neuroses, of inflammatory lesions, of nutritional disturbances, paretic and spastic disorders of obscure or unknown origin which have been cured or markedly relieved by the removal of teeth which were causing irritation. In the American System of Dentistry, edited by Litch, Prof. A. P. Brubaker has collected and collated a long array of reported reflex cases, all having a dental origin. Others are reported by Burchard, Salter, Hollander, Pickerill, Colyer, Tomes and Newell, Smale and Colyer, Colemen, Wedl, G. V. I. Brown, Garretson, J. W. White, Abram Jacobi, Henry S. Upson and others in standard works, while more than twelve hundred titles representing case reports and formal articles are published in *The Dental Cosmos* alone.

Of the disorders thus reported as having been due to dental irritation and to have been cured or benefited by its removal, the following are the most important: convulsions, collapse, mania, various neuroses, neuralgias, paralysis motor and sensory, ptosis, amaurosis, epiphora, nictitation, lagophthalmos, ocular pains, pupillary contractions and dilatations, lacrimation, amblyopia, alopecia, herpes zoster, chorea, epilepsy and insanity; a formidable list which in the light of more recent investigation seems destined to grow rather than diminish.

I do not wish to be understood as contending that the disorders enumerated are always caused by peripheral dental irritation, but that dental irritation in certain types of individuals does so express itself I regard as abundantly proven from clinical evidence in cases where complete cure promptly has followed the removal of a tooth which was the evident source of irritation. The comparatively large number of cases of this character among children, of school age and earlier, gives to the problem an important economic aspect apart from humanitarian considerations. Mental backwardness, imbecility, epilepsy, paralysis, dementia precox, defective vision and hearing are defects which, when pronounced, make the unfortunate victims thereof, in a large proportion of cases, charges upon the benevolence of the State. The evidence already available shows that certain of these unfortunate cases are due to dental irritation and are remediable by removal of the source of irritation. It is therefore of the utmost importance that a definite and systematic study of this much-neglected field should be undertaken, with a view to determining what percentage of this large class of defectives may be restored to normality and usefulness by elimination of all sources of dental irritation.

The attention of the dental as well as the medical profession is for the present largely directed toward focal infections in connection with the apical root areas and the metastatic lesions originating therefrom. The importance of these septic invasions in relation to bodily health cannot be overestimated, and the results of their study are destined to be far-reaching, not only as regards bodily health conditions, but by compelling a complete reorganization of dental operative and prosthetic technic upon the basis of and in accordance with the demands of aseptic surgery. But in recognizing the pathogenic potentialities of apical foci of infection we must not overlook, much less ignore, the serious importance of non-septic physical peripheral nerve irritation of dental origin as a source of bodily disease, often of the gravest character. Many such cases are recorded, but they seem to have been reported mainly as phenomenal and unusual aberrations from normality. Little or no systematic, scientific study of this field of pathology seems yet to have been undertaken, and it is a field pregnant with large possibilities. That an impacted third molar should, in one individual, set up an irritation resulting in chorea, and the same source of irritation in another individual result in a motor paralysis, presents a problem in nervous reaction that is of fundamental importance in pathology, having broad relations, not only to neurology, but because it indicates a fundamental difference in the ground in which a disease reaction is manifested to the same type of irritant, it cannot fail to operate as a factor in bacteriopathology as well.

Medicine has clearly recognized in principle the existence and importance of reflexes arising from peripheral irritation. Eye strain, either from refractive errors or insufficiency of the ocular muscles, is known to be productive of a variety of reflex phenomena among which are recorded, headache, neuralgia, nausea, loss of muscular coordination, insomnia, paralysis and epilepsy. The latter disorder has been also "definitely traced to the peripheral irritation caused by the entanglement of nerve endings in the cicatrix of a superficial wound, the aura originates in the scar tissue and the least pressure is immediately followed by an attack." § Many other examples might be cited, but the foregoing will suffice to show that while medicine and surgery have recognized in principle the importance of reflex pathological phenomena, they have practically ignored the phenomena of pathological dentition, which probably will be found to be the most fruitful source of disturbances of that character.

The reason is not far to seek. Dentistry, having monopolized the oral cavity and its contained organs as its field of exploitation, has concerned itself principally with the mechanical aspects of its work, and only within a comparatively recent period has directed attention to the biologic factors which fundamentally are concerned therein. The immense importance of the teeth stimulated by the scientific writings of Miller, and more recently health relations by those of Sir Wm. Hunter from a clinical standpoint, have directed the attention of physicians to the pathogenic possibilities of the mouth as a focus of infection, with the result that dentistry has been compelled, in its own interest, to give increasing attention to the subject, not only from the biologic point of view but from the standpoint of its prosthetic and operative technic.

The whole subject of oral sepsis is in a fair way toward effective consideration, and, it is to be hoped, satisfactory solution. What remains to be done is a study of the pathologic reactions arising from irritations of the innervation of the teeth, or what we ordinarily designate as pathological dentition, a group of disorders of most protean character that may become manifest at any time during the normal dentitional period from birth to about the eighteenth year, or at any time thereafter where dentition is interrupted or delayed.

The late Professor Henry S. Upson, of the Western Reserve University Medical School, had this subject under investigation at the time of his death. His book, entitled "Insomnia and Nerve Strain," embodies the results of his studies of reflex disturbances caused by peripheral dental irritation. It is regrettable that his untimely death put an end to the research which he had undertaken. Through the suggestion and benefaction of his widow a Commission known as the Henry S. Upson Research Commission, composed of eminent specialists, has been formed in Philadelphia, with headquarters at the Thomas W. Evans Dental Institute, where the study of cases arising from dental peripheral irritation is being systematically carried out, with already very promising results. Similar organizations should be established in all the large centers of population so that the relief which, as the result of such investigations may be afforded to a large class of unfortunate defectives, thus can be made generally available.

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§Moullin's Surgery, Second American Edition, p. 298.

DISCUSSION

Dr. Hugh W. MacMillan. I never have had greater honor or greater pleasure in my professional life than those afforded by the opportunity to open the discussion of this paper. To me it is the realization of an ideal. For a time previous to taking up the study of dentistry, it was my good fortune to work in the office of one of the best practitioners in New York State. I attended to the usual duties around the office, such as cleaning up, mixing plaster and polishing plates, but I was not entirely satisfied with this routine work. I found myself endeavoring to find the reason why plaster "set", why rubber became hard when vulcanized, and the "why" of various other phenomena which occur in laboratories. One of the greatest pleasures which I had during this work was the privilege of reading the *Dental Cosmos.* I used to look over its articles and dream of the time when perhaps I would be able to write some of them myself. I looked upon the editor of this magazine as an ideal. I learned that he was Dean of one of the best dental colleges in the world, and then it was my ambition to study under him. I remember one of the most interesting parts of this magazine was its editorials, which rank among the finest literature in dentistry.

The most important point in the consideration of this subject is the reason why these various phenomena which have been described occur. We never can give a rational explanation of these problems until we understand the anatomical mechanisms involved. Many dentists think the trigeminal nerve, which is associated with each of these phenomenæ is concerned only with the teeth. A brief outline of the branches of this nerve discloses the fact that it is the great sensor nerve of the face, anterior part of the scalp, nasal fossæ, jaws, tongue and anterior part of the ear. The opthalmic division divides into the lachrymal, supplying the outer wall of the orbit and lachrymal gland; the frontal, supplying the forehead and anterior part of the scalp; the nasal, supplying the upper part of the nasal cavity. The superior maxillary division supplies the upper teeth, the lower eyelid, upper lip, side of the nose, and through the temporo-malar, the tissues of the temporal fossæ. The inferior maxillary division supplies the lower teeth, side of the tongue, chin, lower lip and, through the auriculo-temporal, the tragus. The fifth nerve is a mixed nerve and sends motor branches to the muscles of mastication. You can see by this short description the intricate reflexes that may occur due to its wonderful distribution and its exposed position.

Thus far we have been concerned with the peripheral branches of the nerve. To me the internal connections are far more interesting. Tracing back the motor division it will be found to end in the chief motor nucleus in the upper part of the pons Varioli. The sympathetic fibers come from the mesencephalic root, located anterior to the chief motor nucleus. The three sensory branches pass into the cranium and converge into the Gasserian ganglion. From here the sensory tract passes into the substance of the brain and ends around the cells of the reception nucleus of the trigeminal nerve, at the upper part of the substantia gelatinossa Rolandi. Here each neuron divides into ascending and descending roots. The axones of the reception nucleus are gathered in the median fillet and end around the anterior nucleus of the thalamus. From here the sensations are carried to the cortical areas through the internal capsule. Direct evidence has shown that the trigeminal nerve is in intimate connection with the III, IV, VI, VII, and XII nerves through the posterior longitudinal fasciculus. It also sends collaterals to the motor parts of the trigeminal nerve and to the vagus nerve which would probably explain the digestive disturbances mentioned by Dr. Kirk in his paper.

We have all noticed in our work that the infliction of pain causes a profuse flow of saliva, associated with muscular reflexes. Nearly every one here has had patients with impaired vision who have been able to read the newspaper following the extraction of diseased or impacted teeth. Cases of temporary deafness, associated with ringing of the ears, have been known to clear up after the removal of impacted molars. Obscure neuralgias, even tic douloureux, have been completely cured by the removal of some agent causing pressure or some area of infection in the jaw bones causing a perineuritis. You have seen cases of temporary paralysis (perhaps more properly "fatigue") of the fifth nerve caused by constant irritation. Sometimes, coincident with this sensory paralysis, will be observed a pseudo-paralysis of the motor nerves of the part, due to the loss of the sensory nerve supplying the muscle sense and regulating the nutrition of the cells. The cause of these various phenomena has as yet only been partially explained, but even now sufficient is known to demand consideration of abnormal conditions in the jawbones as possible causes.

Three or four years ago we could not talk as we are talking tonight, but some of the recent findings have vindicated the pioneer observers who have reported similar cases. I recall a discussion of this kind a few years ago with a prominent neurologist who ridiculed the idea of the teeth causing these disturbances. I am very glad to report that in his particular case he is coming into the realization that the mouth and its contained structures are really a part of the human anatomy.

In this connection I wish to relate briefly the history of one of my cases:

> The patient, a young lady, twenty years of age, occupied as a laundress at the City Hospital, had been suffering for three years from severe headaches, which were of such intensity that she feared she would become mentally unbalanced. Every morning for more than a year the headaches would come on, and gradually disappear during the day. For a period of three months she was unable to leave her bed. During this time ice packs were kept around her head and sedatives administered.
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> Two years before the operation, the left side of the face became numb and stiff—a complete sensory paralysis of the trifacial nerve. This sensory paralysis was so marked that she had to be very careful when curling her hair not to burn herself. Once she did burn herself which was detected by the odor of burnt flesh. She was advised by her physician to apply a hot-water bottle to the wound. As the water in the bottle was too hot and she couldn't feel it, she scalded herself.
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> At the time of the operation, the sensation had partially returned in the region of the mental foramen, but on the left side, the upper jaw, roof of the mouth, nose, cheek, eyelids, forehead, and the frontal region of the scalp were completely paralyzed.
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> About the time when the face became paralyzed she became partially blind. The eyeball became red and felt like a ball of lead. Objects would appear double and then hazy. The right eye also became weakened. Following this, for four weeks she became totally blind. At this time she was under treatment by a specialist who could not diagnose the cause of her blindness. When the sight returned, the eyeball became stiff, which condition remained until after the operation. During her illness she had medical attention, electric treatments and massages, and had been placed on a diet.
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> On examination of her mouth two deciduous upper cuspids were found. Just behind in the hard palate, two elevations were felt which were diagnosed as impacted permanent cuspids. This diagnosis was confirmed by radiographs. The irritation effected by these impacted teeth was promptly suggested as the cause of the headaches, the paralysis, and ocular affection. A prompt removal was advised.
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> After injecting sixty minims of novocain in the spheno-maxillary fossae, the impacted teeth were removed uneventfully. A condition of hyperplasia of the cementum was noticed. The teeth were of normal size and lay nearly horizontal in the palatal process.
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> The day following the operation, there was a slight swelling on the right side and slight localized pain in the wound. The swelling soon disappeared without treatment. The pain was alleviated by the use of orthoform tablets, which were allowed to dissolve in the mouth.
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> Four days after the operation, the left side began to swell slightly, the wound became painful and response to irritation was obtained in the region of the infraorbital foramen, which region had been heretofore insensible. The swelling continued for several days and gradually disappeared without treatment. The wound was slightly painful for four weeks after the operation.

In the above description, the important part to be noticed is the fact that the paralyzed side did not at first become inflamed as did the right side. When the tonicity of the nerves controlling the inflammatory processes returned, then the tissues reacted to the stimulus with the attendant symptoms.

Three interesting problems come up in the history of this case. *First:* Why and how could these impacted teeth cause the paralysis? *Second:* How could these impacted teeth impair the vision when the fifth nerve is not the nerve of sight? *Third:* Why did not the swelling occur previous to the return of sensation on the affected side?

It is a well known fact in physiology that tissues subjected to continuous irritation finally fail to react to the stimulus. Although it has not been proven that the nerve fiber becomes fatigued, it is not irrational to suppose that the pain-centers in the thalamus are impaired by the accumulation of the products of metabolism due to the constant stimulation. In the case mentioned, the steady and constant pressure of the impacted cuspid on the nerves in the jaw-bone might have caused a fatigue, producing the anesthesia. At any rate the sensation returned after the removal of the pressure.

Associated with the trigeminal nerve are four sympathetic ganglia: the opthalmic, Meckel's otic, and sub-maxillary. These ganglia are little brains which control the various involuntary mechanisms of the body. The ciliary ganglion sends branches to the ciliary muscle, cornea, and iris. This ganglion receives its sensory root from the nasal branch of the opthalmic nerve, its motor root from the oculo-motor, and its sympathetic root from cavernous plexus. The laws governing the relations of the ganglia to its branches of communication have never been solved but there is no doubt that prolonged irritation causes changes in the parts supplied by the ganglia. At least clinical evidence points to it. Dr. Martin Fischer has shown that the character of emulsion is changed entirely by the water content. It is possible that changes in the cornea resulting in impaired vision may be due to the reflex irritation affecting the nerve regulating its nutrition. Similarly, excessive flow of saliva can be explained by a study of the connexions of the otic and submaxillary ganglia.

When a part is anesthetized locally, there is no swelling following a traumatism. This is daily observed in the use of local anesthetics. The sympathetic centers in the cord control the sympathetic ganglia supplying the media of the arterioles. Irritation is transmitted from the end organs of the sensory nerves producing the various reflexes, pain and inflammatory changes. If the conducting path be cut or anesthetized, the sensation can not reach the cord or brain, and hence there are no reflexes or pain until the conducting path is again normal. In the patient under consideration, the swelling came several days following the operation while the sensation was returning. If the sensation had not returned the part would have healed with no inflammatory changes.

We have probably learned as much if not more from the paper we have heard this evening than from any other, but I believe that Dr. Kirk has done more good in coming here this evening, not because of the knowledge he has imparted to us, but from the fact that he has opened up a new field of investigation, and given us a new inspiration to work. The function of a great mind is not only to do a great work but to impart inspiration to others to do a like work. I think Dr. Kirk has personified in his life those four great words—"Observe, Compare, Reflect, Record." I believe that Dr. Kirk's association with *The Cosmos*, thus coming in daily contact with these four words, has caused them to become embedded in his character in such a way that he personifies all of them. I think the greatest thing that has been accomplished tonight is the inspiration which he has given us to work and to endeavor to make dentistry, in Dr. Kirk's own words, "The Profession."

Dr. Frank W. Sage: It was my honor and great privilege to meet Dr. Kirk for the first time at the meeting of the Dental Congress, in Chicago, in 1893. There were 1700 dentists in attendance on that occasion, and I had the presumption to offer a paper for one of the sections. This paper was published in the *Cosmos*, on the grounds, at the time, which was, I felt, the greatest compliment I ever had received.

In studying pathological conditions found under existing conditions of civilized life, it might be of advantage to go away back to the savage races, in order to find out by tracing downward, just where the divergence between the normal and sub-normal or abnormal sets in. This is to assume that the savage races were normal.

When we seek the cause of contamination in a stream, the radical procedure is to begin at its source and, descending, look for the occasion of offense. As we descend, following the rill's course, we come presently to the remains of a bird decomposing in the stream. Perhaps, a mile further down in the wild woods of the mountain, we discover a polecat decomposing in the same stream. Now, had we proceeded from below toward but not to the source of the stream, we might readily have concluded that the decomposing polecat was the sole cause of the contamination. So, possibly, it follows that in tracing the causes and in studying the phenomena of obscure lesions, we might achieve more satisfaction by ascending far above the apparent sources of all, reaching back far anterior to our present civilization.

The foregoing incident is designed to illustrate the two phases of scientific investigation and incident conclusion, presented to the dental profession by the researches of Dr. Pickerill, on the one hand, and Dr. Michaels, of Paris, France, and our own Dr. Kirk, of Philadelphia, on the other hand. Dr. Pickerill, having ascended part way toward the source of the stream requiring inspection and investigation, hasincidentally, perhaps it is not unfair to say, discovered that the administration of acids, vegetable acids used as a tooth-wash, causes an alkaline reaction of saliva, whereby not only is the acid wash neutralized, but also the lactic acid excreted by the organisms responsible for decay. Dr. Kirk seems to have ascended the stream still higher, discovering that glycogen fermenting in the mouth, probably supplies carbohydrates, the pabulum on which germs of decay subsist. The latter discovery seems to come nearer reaching ultimate causes than the other Now the query is presented, what might be achieved by ascending still higher—possibly to the source of the stream? We have been shown on the screen the skull of a five-year old child which forcibly reminds us, by the crowded condition of the teeth of the first and second dentition, of the severe stress of this period in child life. How interesting it would be to see thrown on that screen, the skull of an Indian child of the same age, possibly showing conditions far less suggestive of stress.

When an artist wants to copy the paintings of a great master, he does not seek some other copy of the same to recopy, but goes to the original, if possible. So the sculptor resorts to the most famous ancient statue accessible to him.

It is not consistent for one like myself, only theoretically familiar with the latest researches in histology, pathology and therapeutics, to presume to lead others better qualified into the right way of procedure. Yet, on the principle that a cat may look at a king, I venture a few suggestions.

Researches among the ancients reveal the fact that many primitive people were wholly free from caries of teeth;—the ancient Mexicans, Peruvians, Patagonians, the aborigines of Australia, of Madagascar, of the Malay peninsula. Most significant of all is the statement that, while the Maoris, the native inhabitants of New Zealand, were formerly wholly free from caries, within a hundred years, since the English colonized the islands, and the Maoris came to adopt their ways of living, they suffered with caries. So, too, the same condition is true of our North American Indians. As late as 36 years ago, an officer of the Seventeenth U. S. Infantry, stationed at Ft. Yates, Dakota, examined the teeth of several hundred Indians, warriors, squaws and children, finding no decays. The same result followed the examination of 900 Apaches. Yet, when these Sioux Indians, first referred to, began to live in houses, to eat white men's fare, their teeth began decaying. This I have from a personal acquaintance and relative, a Major of the Seventeenth U. S. Infantry.

Notwithstanding the fact that Dr. Pickerill, who is the dean of the dental college in the University of Otago, New Zealand, has given especial attention to the study of the salivary secretions and has suggested a remedy for carbo-dehydrate decomposition, and has written much about the affections of the teeth, face, mouth and jaws, as he has found them in that country, I have yet failed to discover any reference on his part to the aborigines of New Zealand; instead, he goes to England to pursue his researches. If I am wrong in this statement, I invite correction. How about these Maoris, the natives, still living according to the ancient standard? Have they reflex disturbances arising from dentition? Have they malformations, mental insufficiency, menstrual difficulties, due to over-functioning or under-functioning of the pituitary body, the thyroid and para-thyroid glands, the thymus and the suprarenal capsules? Who knows?

We hear of excessive fatigue, lack of nourishment, and other agencies causing or contributing to various diseases of civilization. What about the Indian, often half-starved, weakened by exhaustive effort, fleeing for days and nights at a time, from an enemy? Does all that bring on diseased conditions in his system? Why, when his strength is exhausted, does he not fall a victim to micro-organisms?

We are told that the Indian is quite as susceptible to the ravages of disease, once he is exposed to it, as a white man. Whole tribes have been wiped out by the ravages of small-pox, measles and other diseases. Very susceptible, indeed, is he. Back of all that still remains the question to be answered, why does he not spontaneously develop these diseases, that is, in his native, secluded state? The fact that he does contract such diseases, under exposure, seems to have diminished interest in the study of his normal superiority, as related to his white brother's inferiority.

Let us consider briefly the physical insensibility of the Indian, as illustrating immunity from exposure sure to prove fatal to the most hardened white man. The late Charles Darwin, author of "The Origin of Species," and other familiar writings, many years ago voyaged in the ship "Beagle," to Patagonia, in pursuance of his anthropological researches. He relates that while the ship lay at anchor in the Straits of Magellan, an Indian woman put out in a canoe and, prompted by curiosity, spent an entire day paddling around the ship. Although a driving snow storm had been several hours in progress, the woman held a new-born infant at her breast. Both were entirely naked. The snow piled up on her shoulders, breasts, and all over the infant. She gave no evidence, nor did the child, of suffering.

My sister-in-law relates an interesting incident connected with her visit to the camp of Sitting Bull's warriors, near Ft. Yates, Dakota, in 1880. A number of squaws were gathering sticks on the prairie. Presently, it was noticed that one of them had disappeared in a thicket. In about an hour afterwards, however, she reappeared, bearing a new-born infant, which she proceeded to give into the care of an old squaw, while she resumed her occupation of gathering up sticks. My sister-in-law further stated that Indian babies seldom cry; indeed, she said she did not believe they knew how to cry.

Heretofore, there has been apparently no linking together, in point of significance, of these extraordinary phenomena of native tribes surviving, uninjured, the severest trials of privation and exposure, with the comparatively easy collapse of civilized humanity, fortified by latest resources of advanced science. By way of getting even with Dr. Kirk, I call upon him, in closing the discussion, for instant, unhesitating reply, by way of elucidating this matter."

Prof. H. McE. Knower: The last speaker struck a very important line of thought which we may profitably follow still further back. His insistence on the value of comparative anatomy and physiology, in considering the relations of the teeth to the body, is a point well taken.

In our study of the origin of the teeth in the embryo, we find epidermal papillæ growing inward to form the enamel organs, which then become associated with the dermis to produce the complete structure. Comparative studies of embryos of the higher forms and tooth formation in various groups of lower animals lead us back to the simple conditions found in the shark. Examining its skin under the microscope, we find minute teeth all over the surface, in all regions of the body. As we pass into the mouth we find larger and larger teeth, rows of them. Further back, still more rows of large powerful teeth are found, all developed on folds of skin at the entrance of the digestive tract, specialized for activities of primary importance to the well-being of the animal. Thus, in an adult animal of a most distantly related type, we find the same relation between the skin and teeth as is discovered in early human embryos.

Such comparative studies enforce the contention that the healthy condition of the animal's skin not only concerns the digestive system, the nervous system, the skin, etc., but involves an intimate correlation of growth and physiological interdependence. Thus the development of teeth has, from the beginning, been very intimately related to the general systemic conditions.

The study of primitive man, his different food, his simpler habits, and his crude abode is a hopeful field for discovery of causes of pathological relations of dentition.

There is no doubt about the fact, from an embryological standpoint, that a great many of these cases which we are now studying with the X-Ray and which are met in practice in civilized communities, are the result of the new environment in which men are living. Most of us are not living normal lives for such bodies, in any respect. A few have made some attempt to return to the simple life, but more of us ride in cars or automobiles every day instead of exercising our muscles normally; we eat soft food, and actually harmful food, such as the savage could not obtain; and we are subjected to hundreds of influences which strain our nervous systems in a manner never felt by our primitive ancestors. The subject is one of intense interest, and of far-reaching importance in the study of the inter-relations of the teeth and the body.

One feature of Dr. MacMillan's discussion is surely comforting to the anatomist; that is, the importance which he attributes to an accurate knowledge of neural anatomy. It is really necessary to know the branches of the fifth nerve, its roots and its pathways through which relationships are established between this nerve and other organs of the body. He insists that these connections are so definite that a knowledge of them gives a key to the possibilities of involvement of parts far removed from an impacted tooth.

We anatomists do indeed feel the force of this, for we realize how it stresses the definiteness of the problem before us. Here is no longer a simple matter of general chemical action on a mass of so-called nerve substance in more or less loose chemical combination. We see much more than this! There is, rather, a complicated and very definitely organized system of pathways which we are only beginning to understand, but the inter-relations of which will influence the result when a stimulus is sent in,—and the result will be different from what might have been expected among our ancestors, because of the changes which we have made in the connections.

In fact, we are no longer living in the simple hut of our primitive ancestors. Our food is seldom well-adjusted to the needs of our bodies; our habits are more complicated and disturbing to normal function; and the house we live in is full of specialized equipment. The pretentious modern house not only reflects much of the complications of our environment, but its electric wires for burglar-alarms, heating, lighting, ringing bells, and supplying power and telephone service give, in miniature, some faint idea of the far more intricate neural connections which Dr. MacMillan has referred to as to be found in our brains. These connections are more complexly organized and sensitively related in the brains of civilized man than in those of former days.*

Such considerations should lead not only to a more thorough study of the evolution of brain connections, but should encourage us to look for the solution of such problems as are before us tonight, through definite experiments performed on the anatomical system so revealed.

Someone has spoken of the ductless glands. As I listened to Dr. Kirk's remarks on the action of the teeth in disturbing the nervous system and the body in general, I could not but feel the bearing on this of Cannon's demonstration of the way in which a far distant, and physiologically powerful gland, like the adrenal, may be so excited through the sympathetic system as to cause a profound effect upon the whole body. Cannon's book† on bodily changes in certain emotions is well worth reading in this connection, not only on account of the definite scientific method by which he reaches his conclusions, but because of the exceptionally interesting style of treatment.

Dr. C. R. Holmes: I did not come here this evening to talk, but to listen and learn. I was especially anxious to come, since it recently was my pleasure to visit Dr. Kirk at the University of Pennsylvania, with a Committee from our Medical Department — on which occasion, we all greatly enjoyed and profited by what Dr. Kirk so kindly showed and explained to us in that wonderful institution over which he presides, and the perfection of which is in a large measure due to his foresight and constructive genius.

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*See W. K. Brooks—"Foundations of Zoology," Lecture III, P. 52 etc., Macmillan Co.

†See Cannon, "Bodily Changes in Emotions, Pain, Fear, Rage, etc."D. Appleton, 1915.

I have been much impressed with the masterly presentation of the subject-matter this evening, and can add nothing, excepting to state that I have observed a number of typical cases of this character in my own practice, either involving the eyes or ears, one of the most typical of these cases being that of a prominent woman, fifty-two years of age, who was treated by me in 1905. She had suffered for years with tenderness of the left eye, with congestion of lids and globe. Examination of globe of the left eye showed it to be normal, with no error of refraction. The nose and accessory sinuses were normal. Eighteen months before, she had lost her left canine tooth, which a dentist stated was her "milk tooth," and the permanent tooth was then coming down into position, being held by gold bands to keep it in proper alignment. The inflammation continued for a few months longer, the tooth meanwhile constantly coming down nearly to its normal position. At the end of that time, the irritation of the eye ceased entirely, without treatment, and has remained well ever since. As years have elapsed without any return of the eye trouble, I feel sure that the tooth was the cause.

I could relate several more cases, but will not take up your time. I believe we all agree that minute infections or irritations, (especially pressure) by their long continued action, often bring about functional or pathological changes which can be cured promptly if we find the source of irritation.

I wish to congratulate the dental profession upon the marvelous progress it has made, rapidly becoming one of the great and most importnat departments of medicine. Our department of oral surgery and dentistry in the Cincinnati New General Hospital is, thanks to the excellent work of Dr. Hugh MacMillan and his associates, rendering most valuable service to our hospital patients.

Dr. Chas. T. Souther: I do not know when I have listened to a paper which has presented more of interest, even to a medical man. I believe it is impossible for us to gather together and listen to papers of this kind without deriving from those papers not only knowledge of absolute advantage, but also a degree of enthusiasm that is only possible to obtain from the enthusiast, and that is what we may call the gentleman who presented the paper tonight.

Dentistry, in its relation to medicine, may be said to occupy one of the most important chapters in medicine. I do not believe that the study of medicine is as complete as it should be until it is better represented from the standpoint of the dentist. We are getting closer together as the years go by, and I am quite sure that, even since my time in medicine, I have noticed a gradual getting together in our ways of studying those branches which are akin to both medicine and dentistry.

We can make a diagnosis of any condition only when we have two requisites. We must first know all of the symptoms that are pathognomonic of the condition with which we are dealing, and second, we must recognize these symptoms when we are brought face to face with them. This we are unable to do unless we have had them brought before us in just the manner in which they have been presented tonight.

It would be interesting to know whether or not the boy whose picture was shown in the series presented by Dr. Kirk, had received a course of thyroid treatment. As the pictures were thrown upon the screen, I was immediately impressed with their resemblance to cases of hypothyroidism. We do not know very much about anything, when it comes to the real point of the matter, but there is a class of cases in which these seem to represent, and which form a group known as hypothyroids, or cretins. It would be very interesting to know whether or not these various infections of the teeth have any bearing upon the secretions of the thyroid.

I am reminded tonight of a most distinguished man, E. de M. Sajous, of Philadelphia. That man's work has been interesting to me ever since I have known anything about him. I think he is the most advanced thinker in the world today on internal secretions. Any one who is familiar with his work cannot but marvel at its immensity, at the amount of material and the number of experiments he has made. He is the most indefatigable worker that it is my pleasure to know. How he finds time to accomplish such a great amount of work to me is always a mystery. It is said that occasionally he is known to go into seclusion in order to find opportunity to complete a two or three thousand page book.

The description of the reflexes and the relations they bear anatomically to the subject presented tonight was presented in a most masterful way by Dr. MacMillan. He certainly shows an unusual familiarity with the subject. I recall that Dr. Lewis and Dr. Phelps, who were professors of anatomy in days gone by, would have to go over and over these things each year before they presented them to the class, and we are all no better, and few as good anatomists as those men were. It requires a great amount of work to keep oneself familiar with the detailed anatomy, and to present it as it was presented tonight.

That these cases are extremely important and are being recognized as such day by day, there is no question. This fact is very largely due to our access to the X-Ray which pictures very clearly the various bone conditions.

I feel that I have been immensely benefited by listening both to the paper and to the discussion this evening. It is always a source of pleasure to come in contact with a man who is a real enthusiast. I feel that Dr. Kirk's paper has not only imparted to us much of his rich store of knowledge, but he has been the means of arousing within us a kindred spirit of enthusiasm which will, I feel, be fruitful of much good.

Dr. Varney E. Barnes, Cleveland: I consider it a great pleasure to be able to listen to Dr. Kirk, as well as to the discussion which has followed his paper. It pays to give close attention when Dr. Kirk speaks.

After some study of these reflex disturbances, consultation with many neurologists, and a considerable number of arch expansions for subnormal children, I have come to the conclusion that the reflex disturbances are found in subnormal organisms.

We may relieve reflex disturbances by the extraction of teeth or often, better still, by the proper expansion of dental arches, but we must not expect to make normals of these abnormals by these treatments. We may markedly help these individuals and give them a better chance in the world. We should consider that we have removed irritating factors.

In the relief of reflex disturbances we must often operate surgically in removing the irritating factors, that is, impacted molars, supernumerary teeth or odontomes. There is a great precentage of cases in which it is possible to give relief and to obtain more satisfactory results by orthodontic treatment.

The proper application of orthodontic pressure provides for the expansion of the arches by moving the teeth and bone away from the pressure areas, in other words, in expanding the arches we should make one-half of the arch move the other half for lateral expansion. After this is done the cuspids and teeth back of them may be massed in anchorage against the weaker incisor teeth to move them forward when necessary. This method of treatment relieves internal pressure and the treatment for the best results should be made upon children from four to six years of age.

Many orthodontic pressures certainly aggravate and cause reflex disturbances, because too often the first permanent molars are used as anchorage in expanding the entire arch, and they necessarily are shifted backward and often impact and aggravate the impaction of the third molars; therefore, we must be certain that orthodontic treatment is physiologically and anatomically applied.

(The relief of reflex disturbances by orthodontia was explained with the aid of about twenty lantern slides.)

Dr. E. C. Kirk: (Closing) I appreciate more deeply than I can express the sympathetic interest you all have shown in the subject of my paper, and I am particularly grateful to those who have taken part in the discussion for the number of interesting points that they have brought out. The subject is so pregnant with possibilities that it seems impossible to discuss every phase of it.

What I do want to emphasize, however, is that we undoubtedly have a large group of disorders that seem to have a very definite connection with physical irritations about the teeth.

At the Miller Memorial meeting recently held in Columbus, while seated at the banquet table, a note was handed to me in which the writer stated that he wished to call my attention to the fact that he had determined to his own satisfaction that many cases of so-called infantile paralysis are due absolutely to peripheral irritation, either septic or physical about the teeth.

I since have been in correspondence with him, and he now has shown me written statements from physicians who have rendered diagnosis of infantile paralysis in cases which have subsequently been cured by treatment to remove the peripheral dental irritation. We know that this disease is regarded as infectious, that it has been quarantined against, that it has been artificially reproduced in animals in one way and another, and yet, here is this other fact of dental peripheral irritation to be taken into account and explained in connection with it.

In the course of my lantern slide presentations, I asked you to consider three cases, one of chorea, one of epilepsy, and another a case of paralysis, all of which were developed from impacted third molars. What does it mean? The type and presumably the intensity of the irritation was the same, the nervous mechanism is presumably the same in all cases, and yet those three different types of reaction were manifested in response to what seems to be the same kind of irritation. There is undoubtly something in the structure or composition of different individuals that makes one respond one way, and another respond a different way to the same type or degree of irritation. We are testing these people out in various ways as to their physioogical and chemical makeup, to see if we can find out why one individual has epilepsy, another chorea, and still another some form of motor paralysis from the same kind of dental irritation. All three cases apparantly cured after removal of the irritation. Therein lies the problem.

I am greatly pleased at what has been said in discussion of the subject, and more than pleased by your evident interest in this field of observation. I think we have a tremendous field of activity before us. I have been mildly called to account by Dr. Knower because I have not said more about ductless glands. That phrase "ductless glands" is somehow always associated in my mind with such terms as "trackless waste" and "pathless wilderness".

Dr. Souther called attention to the case reported by Dr. Weston A. Price. I was interested to hear Dr. Souther say that it looked like a case of hypo-thyroidism. Now whether it is a manifestation of thyroid disturbance or of the pituitary body or whether it is some other ductless-gland trouble, I do not know. I had gotten the impression from my study of Dr. Sajous' writings that the ductless gland system is physiologically, a sort of "interlocking directorate," that they all work together harmoniously, so that when one gets out of order, then they are all thrown out of order more or less; if for example something happens to interfere with the thyroid then the pituitary body may go wrong and vice versa.

As to Dr. Barnes' point of view, whether the failure of development in his case was nutritional, or whether it was an original constitutional defect, I do not know. That, too, is still a problem. We have before us a large collection of data. I was astonished to find what a mass of data has been accummulated. I put an intelligent research man on this subject last summer, and he reported to me 1200 cases recorded in one journal, as the result of his examination of the literature of the subject.

I want to urge that we give systematic attention to this subject, and to see if we cannot through concerted action by various specialists, accomplish something that will ultimately prove of great benefit to humanity. I believe that such an effort will be the means of bringing about that other thing touched upon by Dr. Souther, and which made me applaud when he referred to it, and that is not only a close cooperative relation among specialities of medicine but inclusive also of dentistry. Because of the general relations which are presented to us through the activities of dental reflexes, we must begin to look upon our work as a problem having common interests to all departments of medical science and art.

Life is not so short but that there is always time enough for courtesy.—*Ralph Waldo Emerson.*

THE THERAPEUTIC EFFICIENCY OF ORAL PREPARATIONS*

BY HERMANN PRINZ, A.M., M.D., D.D.S., PHILADELPHIA, PA.

ORAL HYGIENE—the science of oral health, treats of the preservation of the normal equilibrium of the oral cavity and its contents. The remedies intended for the maintenance of the health of the soft structures of the mouth and the teeth may be conveniently divided into those prescribed for specific diseased conditions, and those employed as hygienic measures for daily use. Only those employed for the latter purpose are claiming our interest at present.

In the mouths of most civilized races, the mucous membrane, on account of the present perverted methods of preparing and seasoning our food-stuffs, is found more or less always in a state of mild chronic inflammation, while the hard structures of the oral cavity, the teeth, are subjected to a process of molecular destruction, known as dental caries. Dental caries is not a disease in the same strict sense of the word in which the latter term is usually applied, but is "a process distinctly allied, both in its chemic and bacteriologic aspects, to the general phenomena of putrefaction." — (Goadby) While certain preliminary intrinsic causes, i.e., anomalies of position, outline and structure, etc., may profoundly alter the predisposition of the tooth to carious destruction as a whole or in part, dental caries always will occur if a tooth is subjected to the influence of suitable environment and it does not matter whether the tooth forms an integral part of the anatomy of the individual, or whether it is separated wholly or in part from its original owner. The late Dr. Miller has formulated an explanation of the nature of the carious process, which, at present, is universally accepted, and which defines this phenomenon as: a chemico-parasitic process consisting of two definite states, i.e., the decalcification of the tissues and the dissolution of the remaining organic matrix. In caries of the enamel, the latter phenomenon is not observed, on account of the minute quantities of organic matter contained therein. The accumulation of carbohydrate food debris on and about the teeth is held directly responsible as being the incipient factor in the production of the decalcifying agents. The direct or indirect splitting up of these carbohydrates by fission fungi into acids, i.e., principally lactic acid, furnishes the attacking agent which decalcifies the enamel. The further changes occurring in this process of tooth disorganization do not interest us at this moment.

The hygienic care of the mouth intends primarily to keep the mucous membrane and the teeth in a state of healthy equilibrium by overcoming the above enumerated morbific processes. Nature has instituted protective measures of her own to accomplish the desired end. The normal mouth is fairly well protected against the continual onslaughts of the omnipresent bacteria through an unusually rich blood supply of the oral tissues, a high resistance of their epithelial lining, and a free flow of saliva. The vigorous use of the organs of mastication during the chewing of properly selected food will bring about an active circulation and stimulation of the parts involved and, as a sequence, a rich flow of saliva as required for the washing away of food debris and for the preliminary digestion of carbohydrate food is always insured.

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*Read before the Massachusetts Dental Society, 1916.

Human saliva represents the mixed secretions from the three pairs of salivary glands and the minute mucous glands distributed over the oral cavity. Saliva may be defined as being a weak solution of alkalies, as present in the body juices, more or less saturated with carbon dioxid. It contains, furthermore, several organic substances, among which mucin and the several ferments which accelerate the changes of starches into maltose, i.e., the hydrolysis of polysaccharids into soluble disaccharids. The ferments of human saliva principally represented by the carbohydrate-splitting type, i.e., amylase (ptyalin) and maltose, although oxydase and catalase are always present in more or less variable quantities. The physiologic function of mucin consists in mechanically assisting the food bolus in its easy passage into the stomach, and to protect the oral tissues against irritating substances.

The biologic laws governing the secretion of saliva are directly responsible for its composition, its quantity, and its influence on the digestion and, incidentally, on dental caries. Only the most fundamental facts concerning these biologic aspects can be touched upon at this moment. The secretion of saliva depends upon nervous impulses. The quantity of saliva secreted, i.e., the rapidity of its flow, depends upon the physical nature of the irritant (food-stuffs). Psychic stimulation is of less importance in this connection. Incidentally, the composition of saliva depends very largely upon the rapidity of flow, i.e., its organic and inorganic contents are primarily the sequences as produced by the nature of the irritant. The irritant induces these changes, not merely in the oral mucous membrane, but also in those of the stomach. The latter seems to respond through the formation of hormones. Apparently, as has been shown experimentally by Powlow and his pupils, saliva is a glandular secretion capable of adaptation. However, the fundamental basis of the secretion of saliva rests with the process of mastication, i.e., the degree and the manner of mastication accelerates or diminishes very materially the nature of the irritant. The much-discussed alkalinity of saliva depends directly on its ash contents; i.e., the more ash, the higher the alkalinity. With an increase of the rapidity of the flow an increase of alkalinity is always observed. Alkalinity of saliva as determined by titration is always a "one man's" finding and not to be relied upon.

To correctly determine the reaction of a fluid which, as saliva, hovers so closely upon the neutral points, the electrometric measurement of the Hylion concentration is the only permissible scientific method. The writer has successfully employed for such work the gas-chain apparatus as modified by Michælis. The reaction of normal saliva, i.e., saliva collected during periods of physiological rest of the salivary glands, is so very weakly alkaline that its influence as a so-called neutralizing medium of "acidity" of the mouth is practically nil. As the quality of saliva when collected during active digestion is always an expression of the nature of the last meal taken, saliva intended for analysis should be collected during resting hours of the digestive apparatus. The normal healthy, mature individual produces during waking hours 1 cc. of saliva per minute. During mastication, as stated above, depending upon the nature of the food-stuff, this amount may be greatly increased.

Pickerill has made the assertion that the principal function of saliva consists in the hydrolysis of starches and thus prevents dental caries. The writer has not been able experimentally in the human mouth to show any relationship between the amylase (ptyalin) content of saliva and dental caries. Amylase may be readily paralyzed or accelerated by many chemic agents. Pure amylase is inactive as a ferment; certain inorganic ions, especially the chlorin ion (sodium chlorid) accelerates its activity ten times or more. Normal quantities or even relatively large quantities of amylase may be and occasionally are present in the most rampant forms of caries. In certain aminals, as for instance the domestic dog, very little or no amylase is present in the saliva, although the dog is relatively immune from dental caries.

The much-discussed bactericidal action of the saliva, which is claimed to be due to the presence of small and very variable quantities of potassium sulphocyanid, has been disproved by the classic researches of Miller, Bruylant, Gies, Kahn and Kantcrowitz.

(In a recent paper, McGehee intends to revive the influence of sulphocyanids in its relation to the causation of dental caries, and, as a proof, he hypothetically quotes from Pauli's interesting little work; "Physical Chemistry in the Services of Medicine." McGehee has wholly missed his point. Dental caries is *not* depending on the living organism, and, as a consequence, the presence or absence of this chemical in metabolic processes as related to dental caries plays no part. In the normal mouth pathogenic micro-organisms are usually lest virulent, and they are the subordinates of the saprophytic types.)

Fluegge has shown that the pathogenic bacteria will become extremely active if the individual is afflicted with a slight local disturbance—as a simple catarrh of the throat. Claermont has expressed similar views, and after a careful study of the fluids of the mouth he asserts that one is not justified in stating that saliva possesses any definite bactericidal action. It seems, however, that the parotid saliva of man and of some animals (especially the goat) exercises an inhibitory function on certain micro-organisms—the staphylococci and the streptococci.

(Very recently an hypothesis relative to definite defensive or protective organisms possessed or produced by nature to combat the ravages of dental caries has been promulgated by McGehee. This conception is based on the ingenious experimental researches of Abderhalden, who holds the view that diseased processes are primarily regulated by defensive ferments. McGehee's conception is based on a misinterpretation of the Abderhalden theory. As we have stated above and wish to state again, dental caries is *not* a disease; it is a process of putrefaction which may occur in a tooth, whether this tooth forms a part of the anatomy as a whole, or whether it is detached therefrom. The writer, two years ago, while working on this very question in Abderhalden's former laboratory at the University of Berlin, convinced himself of the fact that defensive ferments in the sense of Abderhalden's protective theory, play no part in the process of dental caries.)

The fermentative changes of the various types of saccharids into soluble sugars, the mechanical washing away of accummulated food debris, and the ability of biologically inhibiting the virulence of pathogenic bacteria are the important functions performed by a freely flowing saliva, and thereby maintain the physiologic equilibrium of the oral cavity.

Immunity to dental decay, in the writer's opinion, depends, *ceteris paribus*; first, on a tooth free from imperfections of calcification; and, second, on a freely flowing saliva.

Immunity as referred to tooth structure is, in the strict sense of the word, a misnomer as it is *not* bound up with vital phenomena. In a biologic sense, immunity indicates a state in which the "living" body resists disease. In a pulpless tooth, it goes without saying that we are dealing with dead structure so far as the enamel is concerned, and it is this latter tissue only that concerns us in the elucidation of the question—"*Why* do teeth decay?"

With regard to a tooth with a vital pulp the writer holds the view that enamel is capable of carrying on metabolic processes to a limited degree. He is able to substantiate this claim by certain pharmacologic reactions which, however, he can not discuss at this moment. The surface of so-called living enamel he regards practically as dead structure which offers no vital resistance to the physicochemic process of decay The omnipresent surface colloids, and the collodial fluids present in the enamel in teeth with living pulps, modify the process of decay. All teeth which are imperfectly calcified on account of their lowered resistance will sooner or later decay until relative immunity is established in accordance with the imperative law of the "Survival of the fittest." If, however, the flow of saliva is impaired or completely checked, all teeth will be destroyed by caries unless some other means for the removal of food debris is established. *THE RAPIDITY* of the destructive processes is proportionally depending upon the severity of the impairment. Normally, the flow of saliva is regulated by the intensity of the irritant as evinced during mastication. The stimulation by acids is of a temporary nature only, and of less importance. Therefore, vigorous mastication, or, as it is called by a recently popularized term, Fletcherizing, of correctly selected food-stuffs forms the basis for the natural prevention of dental decay.

To substantiate our contention relative to the position which saliva occupies in the prevention of caries, we may cite a few examples. In xerostomia, i.e., inhibition of secretion of saliva, the teeth will begin to crumble away with the onset of the dry mouth. During other temporary pathologic disturbances of glandular activity i.e., continuous fevers (typhoid), menopause, diabetes, etc., clinically a marked increase of dental caries is always observed. The change of environments of food supply, i.e., if the natural struggle for existance in gathering food is supplanted by artificially furnished food of a prepared type, a marked preponderance of dental caries, even in hitherto immune herbivorous animals is always observed as, for instance, in captive monkeys. The skulls of wild horses very rarely show carious defects; the domesticated horse is in frequent need of the veterinary dentist. Subjecting wild tribes of the human race to the influences of civilization and, as a sequence, changed food supplies, will always be followed by a most marked increase in dental caries. Immigrants from countries where hard-baked black bread forms a large part of their staple diet, when coming to the United States are frequently subjected to intense ravages of dental decay. For instance, newly arrived Scandinavians, accustomed to chewing "knackerbrod," forget to masticate our soft wheat bread, and, as they are often forgetful of the blessings of the tooth brush, rampant decay is frequently manifest within a few months after landing.

Dental caries is comparatively rarely observed in the teeth of habitual tobacco chewers. Miller and others have demonstrated that tobacco juice possesses no antiseptic action. Its prophylactic effect, as far as the teeth are concerned, rests with the pharmacologic action of tobacco, i.e., its alkaloid nicotin is a powerful saliva stimulant.

In a recent communication (*Dental Cosmos* 1913, p. 1081) Pickerill tentatively admits the importance of the *quantity* of salivary secretions. He states: "I would even suggest that caries of the teeth may be regarded as a symptom of failure of the nervous mechanism controlling salivary secretions to functionate normally." In the writer's opinion *the quantity of the secreted saliva is the sole factor which governs environmental phenomena concerning tooth decay.*

The quantity, and to a less extent, the quality of saliva, on account of our present method of preparing and selecting food-stuffs, and the consequential insufficient mastication, are frequently inadequate to bring about a proper physiologic cleansing of the oral cavity. To assist nature, suitable mechanical and chemic means may be employed to overcome this deficiency. The mechanical cleansing of the mouth and teeth by means of the brush, powder, paste, tooth pick, floss silk, etc., constitutes the absolute fundamental principle of artificial oral hygiene. Food remnants and slimy adhesions between and upon the teeth, together with a large number of the adherent bacteria, are principally removed by mechanical cleansing. The mechanical cleansing of the oral cavity by these enumerated means may, however, be materially assisted by the judicious use of suitable mild astringents and indifferent antiseptic solutions. Powders, pastes and washes containing soluble drugs or drugs in solution are employed for the avowed purpose of assisting nature in accomplishing the desired means to an end; i.e., they must favor the recovery of an inflamed mucous membrane and they must mechanically remove accummulated food debris.

A good oral preparation should possess the following properties—

First: It must be absolutely indifferent in regard to

(a) The mucous membrane—*non-caustic.*
(b) The teeth—*non-decalcifying* (mechanical or chemical).
(c) The organism as a whole—*non-poisonous.*

Second: It must not interfere with the normal physiologic cleansing of the oral cavity, .e.,

(a) It must not inhibit the secretion of saliva.
(b) It must not perceptibly alter the reaction of saliva;
(c) It must not destroy the ferments of saliva.

Third: It must possess sufficient cleansing action, combined with

Fourth: Good taste and odor.

These various enumerated properties are naturally rarely found in combination in a single oral preparation, and yet each one is of the utmost importance.

Hygienic measures as applied to the oral cavity are practised in proportion to the pleasant sensation which they call forth; hence, a mouth preparation which has a disgusting taste is ineffective, because it will not be employed for any length of time by the laity. The great mass of the public will never be induced to practice oral hygiene that involves ill-tasting preparations. As stated above, mouth preparations must be absolutely free from danger as far as the mucous membrane, the teeth and the organism as a whole are concerned. Hence Rœse's dictum should be indelibly fixed in the mind of every dental and medical practitioner; "The importance of oral antisepsis is not so great that we are justified in assuming the slightest risk." This statement can not be emphasized too strongly, in view of the fact that numberless mouth washes and tooth preparations of questionable character are continuously forced on the market.

Unless the correct composition of a ready-made mouth or tooth preparation is known, it should not be recommended.

The majority of the so-called dental preparations which are employed by the laity for daily use belong to a group of medicinal compounds generally known as "proprietary preparations." As those compounds are not used for the avowed purpose of curing a specific disease, but rather as hygienic measures, no objection can be raised from an ethical point of view *provided* that they are prepared from *approved formulas,* and that they conform to the claims as outlined above.

A few of the more widely advertised preparations which are apparently universally recommended by the profession deserve special notice. Bad taste and general unfitness for the purpose in view are the lesser evils of most of these preparations; some are distinctly dangerous to the oral tissues when employed for daily use. The conception that mouth washes, tooth powders and pastes which, in general, are nonpoisonous and neutral in reaction are indifferent to the oral tissues is erroneous. Many of these highly extoled compounds sail under dubious flags. For instance, an alkaline thymolated glycerin solution is claimed to possess extraordinary qualities as an oral antiseptic, while, in reality, it is about equally effective as a physiologic salt solution, but with a less pleasant taste. A fifty per cent. potassium chlorate tooth paste at one time furnished "nature's antiseptic, free oxygen which whitens the teeth;" and while at present it cures "acid mouth", no trace of free oxygen was ever obtained from the use of this paste. The distinctive danger of potassium chlorate to the general health is, of course, not mentioned. Again, a mentholated salol solution is much lauded as "the most persistant oral antiseptic." This compound is rather prone to produce persistent eczematous eruptions about the corners of the mouth. Most of the widely advertised tooth powders, pastes, and certain mouth washes contain too high percentages of soap. Soap, on account of its alkalinity, invariably kills the important salivary ferments.

The list of illy-constructed mouth preparations may be extended *ad libitum.* In spite of the absurd claims made by the manufacturers, it seems incomprehensible that numerous practitioners recommend such compounds to their patients. The best service that a conscientious practitioner can render to his clientele is absolutely to prohibit the use of a mouth preparation of whose innocuousenss he is not fully convinced,

The search for so-called tartar solvents as an addition to tooth preparations—substances which prevent or dissolve calcareous deposits about the teeth—has occupied the minds of the dental hygienist for some time past. The chemic nature of the oral calculus indicates that the logic solvent should be an acid or an acid salt. For plausible reasons, such substances cannot be utilized in the mouth with impunity. It is known, however, that certain alkalies—the salines—prevent the ready formation of calculus, and they help to remove fresh deposits when brought in intimate contact therewith. Just how much of this destruction or removal should be attributed to the mechanical scrubbing of the brush, and how much to the solvent action of the ingredients of the tooth powder or paste is not known at present. Nevertheless, the salts of certain mineral springs, especially those of Carlsbad, are used in concentrated form for such purposes, and apparently with some success. Artificial Carlsbad salts may be incorporated into a paste with calcium carbonate and other abrasives; its only draw back is its disagreeable salty taste. Tooth pastes containing about twenty-five per cent. Carlsbad salt may be obtained in the market.

Innumerable experiments have been made to determine the so-called antiseptic strength of oral preparations. As a standard, the Rideal-Walker phenol coefficient or some other laboratory standard is usually employed as a means of arriving at some tangible conclusion. If these experiments are carried out in test tubes with cultures of isolated organisms, comparative deductions drawn from such tests are wholly unwarranted, as they do not portray actual conditions existing in the oral cavity because the very premises upon which these experiments are based are erroneously chosen. On the other hand, if these preparations are tested directly in the mouths of normal individuals, it is invariably found that an average of only fifty per cent. of the oral bacterial flora is inhibited. Authorities agree that it is impossible to render the oral cavity sterile, even for a short period only, with any of the known antiseptic solutions (pastes, powders, etc., must enter into solution if any antiseptic effect is to be expected), in the strength in which these solutions can be employed with safety. The dilution of these preparations and the short time allowed for their action in the oral cavity as actually employed by the user necessarily minimizes their antiseptic effect to such an extent as to practically render the solution inert.

Recently, Gies has advocated diluted vinegar and Pickerill a solution of acid potassium tartrate as being most efficacious mouth washes. Both recommendations are based on observations made in the laboratory; their correctness is not substantiated by clinical evidence. The recommendation of an acid mouth wash of the above type is based on wrong premises; because, first, the laity will not be induced to employ an ill-tasting mouth wash for any length of time; and, second, the pharmacologic principle involved in the selection of such solutions is erroneously applied. When an acid mouth wash in the form of vinegar or acid potassium tartrate is taken in the mouth, a temporary copious flow of alkaline saliva, rich in mucin, is produced. This alkaline saliva serves as a diluent and neutralizer of the acid and the colloidal mucin acts as a protector of the insulted mucous membrane and the teeth—nature's method of getting rid of the irritant. In accordance with Heidenhain's law, forcible stimulation of salivary glands is followed by impairment of their function. Incidentally, the acidity of these solutions kills the important salivary ferments. It has been repeatedly shown that a physiologic salt solution (approximately one dram of sodium chlorid to a pint of boiled water) and heated to body temperature, reduces the oral flora by fifty per cent., and, incidentally, it is absolutely safe. On the other hand clinical evidence seems to point to the beneficial effects which are obtained by the use of such mild alkaline astringents as well-diluted lime water. E. Kells, Jr., Kirk, and many other observers have repeatedly called attention to the remarkably good results obtained by its continuous use. Its therapeutic effect depends on its solvent power of the mucin deposits on and about the teeth, which mechanically retain food debris and bacteria, and on the formation of insoluble soaps with fatty acids and liquid substances. Incidentally, the freshly precipitated calcium carbonate may possibly exert some mechanical protective influence on the teeth themselves. When employed in proper dilutions, its mild astringent effect favors the recovery of inflamed mucous surfaces which, to a mild degree, are almost universally present in the mouths of most persons. A tablespoonful (one-half ounce) of lime water added to a tumblerful (eight ounces) of physiologic salt solution makes a most serviceable mixture which may be used as a mouth wash with impunity. Incidentally, this solution corresponds more closely to an artificial saliva—nature's protector of the teeth—than any mouth wash found in the market.

The writer has made innumerable tests with the various dental preparations as found in the market, and with experimental mixtures, by plating out specific quantities used within specific times in the oral cavity and counting the number of colonies before and after these tests. These experiments merely verify what has been stated above, namely:

First: Sterilization of the oral cavity with any of the commercial dental preparations or any antiseptic in the strength in which it can be employed with safety, can not be accomplished.

Second: The cleansing of the oral cavity with an antiseptic solution alone or combined with the mechanical effects of the tooth brush, powder, or paste, reduces the number of oral bacteria approximately about fifty per cent. The claims made for the antiseptic strength of certain commercial preparations are, by actual tests, wholly unwarranted.

Third: A physiologic salt solution at body temperature in conjunction with the tooth brush and precipitated calcium carbonate in the form of a powder or a paste (providing these preparations are in conformity with the claims as outlined above) are the safest and most efficient of all known artificial oral hygienic measures.

Some say that they are "too busy" who are not busy at all. They only *think* they are busy. The really busy man is one who *does things* or who sees that they are done. He knows that the right way to do things is to do them as they arise. It is the easiest and quickest way to do much business and keep everything up to date. If I want to get anything done, commend me to a busy man always. He will do it or get it done while the other man is talking about it and explaining that he "hasn't time" to do it.—*The Medical World.*

ARTICULATION OF TEETH

BY LOOMIS P. HASKELL, CHICAGO, ILL.

HAVING HAD A UNIQUE EXPERIENCE in my own person, I am able to present to the profession some information on the subject of the articulation of teeth.

For seventy years I have constructed artificial dentures exclusively, for thirteen years before vulcanite was used; 65 years use of the continuous gum method, and through it, have demonstrated that weight need cut no figure on upper jaw.

For more than thirty years have worn partial upper, partial lower, and full dentures of various methods.

For twelve years have worn, on a flat lower jaw, the problem of the mouth, dentures, whereby I have solved the problem to my satisfaction.

Here is a combination of experiences I may claim no other dentist has had, and as a result I have learned things I could not have learned from a patient's mouth.

Much attention is being given to anatomical articulation. Elaborate articles by prominent authors, and illustrations showing the movement of the lower jaw and the condyle, all of which is well as illustrating the wonderful plans of the Creator, but of no use in connection with artificial dentures.

In these instructions the artificial teeth are articulated precisely as the natural teeth, ignoring the fact that the natural teeth are fastened to the jaws, while the artifical ones are on movable plates, often on flat jaws, upper and lower flexible ridges, changing conditions of the jaws.

The dentist takes great pains in articulating, to follow instructions, using a complicated articulator, observing the three-point contact, etc., but on placing in the mouth has no knowledge of what goes on. Does not know how the jaw moves, what the lower lip has to do in the act of mastication, and it is very important, nor what the action of the tongue is. These things can only be learned by experiences in the mouth of the dentist.

Why cannot patients masticate tough meat or other tough material? Because it requires *grinding* and this can only be done in favorable conditions such for instance, as an upper denture on a good jaw and natural teeth and bridges on the lower jaw.

Seventy years' experience in artificial dentures, using plain articulators but arranging the teeth by the mouth, following strictly the rule that the anterior teeth should *never* come in contact, as sooner or later the upper denture is displaced. I have had very little complaint of difficulty of use in mastication.

A prominent member of the profession remarked to me that he was "in favor of anatomical articulation provided the teeth were *copper riveted to the jaws.*" These five words speak a volume.

Powers Bld'g.

PYORRHEA ALVEOLARIS FROM A MEDICAL VIEWPOINT*

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PYORRHEA ALVEOLARIS has been a subject of very general interest to the dental profession for several years, and it is destined to excite as much if not more attention among physicians in the near future, if recent developments prove at all an index of what we may expect.

This disease has a two-fold hold upon your profession; the first, because of its frequency and the extent and character of its ravages, constituting as it does, next to dental caries, the most potent single factor in the loss of teeth; and second, because of the elusive etiology of the disease. The failure to date of the discovery of the long-sought pathogenic factor, unless the endamœba buccalis is proved to be the maleficent influence, has firmly blocked the way to your discovery of a specific treatment, and even any very general assured ability to cure the victims of its ravages. I make this assertion advisedly, for with all due respect, and acknowledging that many of you doubtless are treating patients perhaps daily with gratifying success, yet nevertheless, so long as many believe on the one hand in the specific activity of the uric acid diathesis, diabetes, tuberculosis, anemia, neurasthenia and the like systemic factors, while others emphasize the like force of deposits, mal-occlusions, bacteria and other such local disturbances, your forces are divided and some of your energies are necessarily mis-directed. Whenever a diversity of causes is ascribed to any one given disease, there follows as night the day, just as great diversity of methods of treatment, with also usually an unvarying lack of success of any one method. Even in the relatively successful so-called prophylactic treatment of this disease, which I believe should better be named surgical treatment, from the character of the methods employed, and the fact that the disease is already well under way as a rule—even in this treatment, one is fighting in the dark as long as the actual exciting cause is undiscovered or unrecognized. You use methods and germicides to kill practically all pathogenic micro-organisms, but so long as you are ignorant of the real organism at fault, its mode of entrance, its habitat, its favorite localities and favoring conditions of growth, you cannot be certain of the effectiveness of your antagonizing efforts nor of the positiveness of your apparent cures.

This is no reflection upon the dental profession. It seems to me that under the circumstances, remarkable results have been accomplished and great credit is due for the result already obtained. Certainly the medical profession should be the last to cavil; it has been in a similar position many times and still is for several diseases. Consider the centuries that yellow fever has been a scourge of the tropics and sub-tropics; even yet its exciting cause is not positively known, but the heroic work of Lazear, Reed and Carroll established its mode of transmission, and indicated methods of prophylaxis which have banished this disease from haunts in which it had been seemingly impregnably entrenched for centuries. Malarial fever presents the same history with the exception that the accidental discovery that quinin in some way was the only effective means of cure of this disease, but it was not until some twenty-odd years ago that the true germicidal action of this drug was understood, and the way in which it operated was recognized.

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*Read before the Ohio State Dental Society, December, 1915.

Many other illustrations might be cited, but it hardly seems necessary. Certainly it is the experience of the medical profession that one may scarcely hope to cure or prevent a disease unless one knows the exciting cause of the disease or its method of transmission. Your comparatively recently organized Council of Research has here a splendid opportunity. You have the experience and knowledge of the various clinical phases of the disease which should be of great advantage in this particular direction. I congratulate your profession on having so much of the scientific spirit as to establish such a body, and you particularly here to-night as among those who helped and encouraged the progressive thinkers of this state who are largely responsible, I believe, for this splendid movement. This body is already making its presence known, and its possibilities for good are tremendous. Your investigators, however, must look to their laurels, for though pyorrhea alveolaris has hitherto belonged essentially to your realm, it has also a two-fold claim for interest upon the medical profession. It has what I may term an academic interest to our laboratorians, because of its questionable etiology, but much more than that hold upon our attention is the recent claim which suggests its possible relation, as a predisposing cause at least, to many extremely important and hitherto unexplained and unexplainable systemic states; a relation so close and important as to demand thorough investigation and elucidation of its problems as quickly as possible.

All honor and credit to the fortunate one who succeeds in solving this perplexing problem. Whichever profession he represents, it will be all to the credit of science and bring us nearer together as allies in the war against disease, and mark a great advance in the relief of human disease and suffering.

Let us consider now in detail some of the interesting features of this disease.

Pyorrhea alveolaris as an evidence of its more or less protean character and the interest it has excited in different observers, possesses at least 13 synonyms that I have been able to discover. These are more or less descriptive of the prominent characteristics, anatomically, pathologically or symptomatically as they have struck the attention of various authors and observers. The term Riggs' Disease, as given I believe in recognition of the success of the mode of treatment suggested by Dr. Riggs, should be discarded as unscientific in the light of modern efforts to discourage the application of the names of individuals in connection with diseases or anatomical structures.

Several of the synonyms employed appeal to me, in so far as I am capable of judging, as really more descriptive and truly suggestive of the true character of the disease, but pyorrhea alveolaris appears to have the choice in common usage, and has the great advantage of being so strongly suggestive of the gross appearance and most pronounced and readily noticeable symptom. It would be an advantage if your authorities on nosology would agree on a terminology and your various organizations adopt it. The chief disadvantage of the present term, as it appears to me, is that it describes the condition as well advanced and so marked that the presence of the disease is obvious, and therefore may tend to veil the fact, or distract attention from the point, that it may be present early, before the pyorrhea, or pus-flow, is well established, and so escape attention at the very time when it would be most amenable to treatment.

ETIOLOGY

In considering the etiology of pyorrhea alveolaris as portrayed by the various and numerous writers on the subject in even the last few years, one cannot but be struck by the more or less confusion which prevails in the descriptions and the lack of unanimity displayed in the views held. This is due I believe largely to the differing view-points of the observers, and the varying interpretations apparently of the terms "exciting" and "predisposing causes," systemic and local, mechanical, chemical and the like, with still more confusion as to the differing relative importance or influence of these factors.

I have in mind, for example, an author who gives eleven different varieties basing his classification on various physiologic conditions, for instance (1) "Diabetic" (2) "Interstitial nephritic" (3) "Infective" (4) "Gastro-intestinal toxaemic" (5) "Presenile" (6) "Senile" (7) "Traumatic" (8) "Chemical irritation" (9) "Mechanical irritation" (10) "Thermal irritation," and (11) "Bacterial irritation," and to these might be added at least a half dozen others with just as good reason. He attempts to give a distinct description of each variety, with a would-be separate pathology and symtomology, and gives elaborate directions as to how to make a differential diagnosis of each.

Here is one who would "cavil over the ninth part of a hair." It is a *reductio ad absurdum*. The disease is the same; the pathology is the same. Both may be modified by various systemic and local conditions, such as age, various diseases, etc., and local reactions, chemical conditions and secondary infection, but the main principles, the classic manifestations, "*Rubor, dolor, calor, tumor et functio læsa*," are always present, with their sequence of atrophies or necrosis, with sometimes, fortunately, regeneration and cure. Let us therefore discard all such complicated and ultra-refined classifications and cast off all but the essentials in the interest of clarity and simplicity.

Diseases in general have two causative factors, (a) conditions which favor their development, called "predisposing causes;" (b) forces or influences which actually produce disease, called "exciting causes."

You are all familiar with the truly wonderful protective agencies of the normal body and its tissues; there must be some change or break in the trenches, so to speak, to allow of the development of diseases. The predisposing causes are the forces which bring about such breaks; mechanically, by traumatism, chemically or through systemic diseases, the local tissues are injured or their resistance lowered, and if the exciting causes are present, in the large majority of cases pathogenic micro-organisms, disease results.

Thus the numerous varieties given by the author above referred to, become *not varieties* of the disease, but merely *cases* of the disease occurring in individuals with diabetes, nephritis, gastro-intestinal toxæmia and the like.

These two causes must always co-exist; before a disease can develop any or all of the predisposing causes may be present, but if the exciting cause be absent, the morbid state cannot manifest itself. And the converse is also true, the exciting cause may be present, but needs positively the aid of one or another of the predisposing causes before it can produce disease.

This is so characteristically true of all infectious or microbic diseases, that it in itself is an argument for the micro-organismal cause of pyorrhea. Not all diabetics, not all nephritics, nor those with gastro-intestinal intoxications by any means have pyorrhea; neither do all those who from time to time suffer, as possibly most of us have, from mechanical injuries about the teeth, chemical irritation or thermal irritation, develop pyorrhea. But on the other hand pyorrhea never developes without the presence of one or another of these systemic or local predisposing conditions, and its continued progress is materially aided by their action.

The true appreciation of these facts is of the greatest importance in the treatment of this disease. You may perhaps remove the exciting cause; if the damage done is not too great, regeneration to some extent at least occurs; but in the continuance of the predisposing conditions the omnipresent exciting cause regains an entrance sooner or later. On the other hand with the proper attention to the predisposing causes, and their removal if possible, the extirpation of the exciting cause becomes easier, and if accomplished, the patient is *cured.*

The causes therefore of pyorrhea alveolaris we would first classify simply as Predisposing and Exciting.

The former may be subdivided into (a) systemic and (b) local. Of these all act either through the system or directly upon the local tissues so as to lower their resistance and favor infection. Thus the diabetic, with his excess of sugar in the blood, provides tissues not only of poor resistance, but also highly attractive as culture media for micro-organisms; nephritis, syphilis, and senility give increase of connective tissue with encroachment upon the blood vessels, with consequent poor circulation, hence low vitality, easy infectivity. Gastro-intestinal intoxications so alter the secretions in which the tissues are bathed as to favor concretions and deposits which act secondarily as local causes. The uric acid diathesis acts largely in the same way, with also local tissue changes lowering resistance. And so on with other general or systemic conditions; they all simply bring about, in one way or another, local lowered resistance, and are important in that their recognition and treatment have great bearing in *aiding* to cure these cases, and especially in *true* prophylaxis.

Of the local predisposing causes, the classification of Spies appeals strongly to me as far as it goes. He gives their varieties as due to (a) mal-occlusion, (b) faulty operative procedures, and (c) deposits. To these should be added, as given, for instance, by Adair and others, (d) mechanical injuries and (e) uncleanliness.

(a) It seems obvious to even one unaccustomed to such conditions that in faulty occlusions, with the stress of mastication or closure of the jaws irregularly distributed on the occlusal planes or incisal edges, there will occur a side strain producing ever-recurring undue pressure on one side of the lateral walls of the alveolus. This in time must deleteriously affect the peridental membrane and even the osseous structures, perhaps interfere with the circulation and lower local resistance.

(b) Faulty operative procedures may produce mal-occlusions, and in many ways produce traumatic or mechanical injuries of the soft tissues. You are so much more familiar than I with possibilities of this sort that I hesitate to discuss the subject. Suffice it to say that the results are practically the same in such injury to the soft tissues about the teeth, and invite infection and favor its development.

(c) *Deposits:* There may be some objection to the including of deposits among *predisposing causes.* Looking at the subject from the unbiased position of critical review, unembarrassed with too much knowledge of the subject, and perhaps "rushing in where angels fear to tread," I still can but feel, judging from analogy to other diseases and the known similarity of action of like concretions elsewhere in the body, that these substances act as foreign bodies, and by mechanical irritation lower local resistance and so predispose to infection.

Adopting the classification of Spies again, deposits are divided into (a) Plaques, (b) Soft deposits, (c) Salivary deposits, and (d) Deposits on the roots. Plaques are deposits on the teeth, partially organic, partially concretions. From the former constituents they are capable of fermentation and causing chemical irritation to the gums. (b) Soft deposits are made up largely of food debris, and act in two ways, by mechanical pressure and chemical irritation. It seems surprising that these soft collections could produce mechanical damage by pressure, but the testimony is overwhelming and you are all doubtless familiar with the facts.

The chemical irritation caused by these deposits is readily understood. They are excellent culture media; they become permeated with saprophytic micro-organisms, ferment, and acid end products exert evil influences upon the soft tissues. (c) Salivary deposits. On this subject I find rather a diversity of opinions and theories among the authorities. However, it is well known that in many situations in the body where we have a fluid secretion or excretion containing salts in solution, that if a certain nidus or foreign body be present there will be a deposit of these salts about these until often large concretions or calculi are formed. These foreign bodies may be a few desquamated epithelial cells, a clump of bacteria or even inspissated mucus. Examples of such are found in the urinary bladder, the pelvis of the kidney, in the gall bladder, the pancreatic ducts and even, rarely, in the salivary ducts. The salivary deposits are made up chiefly of calcium carbonate and phosphate with other salts in small proportions and a certain amount of organic material, such as broken down epithelial cells, mucus, food remains, bacteria, etc. The organic debris probably forms the nidus upon which the salts are thrown down.

(d) The deposits on the roots are extremely interesting; these are the so-called serumnal calculi, so named by Dr. Brown of Georgia, and much discussion has occurred as to their origin, character and significance. Adair says, "This secretion and concreting material is supposed to be formed from some break in the peridental membrane and effusion of the serum of the blood." Continuing he says: "If this theory is correct the process has never been successfully explained." Spies, above mentioned, cites the experimental work of Klotz which certainly sounds very plausible, as to their formation. Certain is it in other portions of the body, for instance about a tubercle in the lung which has become quiescent, that where there is an area of destroyed cells; these cells undergo fatty degeneration; the fat produced has an affinity for calcium salts in solution in the blood, the fatty acids uniting with the calcium to form really a calcium soap, the caseous material so often found in tuberculous tissue. This is further acted upon by the acid sodium phosphates and carbonic acid in the blood and lymph, and insoluble calcium carbonate and calcium phosphate are deposited as hard concretions completely encompassing the tubercle. Such masses like grains of sand are frequently found at autopsy, and are accepted evidence of healed tuberculosis.

Spies believes that Klotz has shown that a similar process takes place on these serumnal deposits. The peridental membrane is injured in some way, degenerating cells present the fatty albuminates, the inflammatory state brings excess of blood and lymph and the chemical reaction precipitates the hard deposits about the roots. From this point of view these deposits appear as a result rather than a cause of the disease under discussion, but on the other hand, when once begun, they establish a vicious cycle. The degenerating tissue may cause the first concretions, but the latter by their presence induce further irritation and degeneration of cells, which in turn add more to the concretions, and so on indefinitely—hence the importance of these as predisposing causes of the *continuance* of the disease and the *very great* importance of their removal in the treatment.

The remaining predisposing conditions mentioned (d) mechanical injuries, such as from splinters of wooden tooth picks, bristles from tooth brushes and other trauma, and (e) also general uncleanliness are so obvious in their action as to require no discussion before such a meeting as this.

EXCITING CAUSE OR CAUSES

In spite of the fact that at some time or other many of the best men in the dental profession, such authorities as Kirk, Epstein, Endelman, Peirce, Fletcher, Talbot, Haig, Miller and others, have gone on record as favoring the belief as to the constitutional disturbance in metabolism as the cause of pyorrhea, I believe that the whole general trend of modern thought is toward its infectious or micro-organismal origin. From analogy to other diseases of known germ origin, from the character of the most successful treatment, from the pathologic changes in the tissues, the only deduction we can draw is of a similar cause for Pyorrhea Alveolaris. Practically the only arguments against it are because of the deep rooted, almost sentimentally so, theories as to the constitutional causes, fostered too often by various drug houses with high-priced preparations to eliminate uric acid and the like, and secondly, the failure to find a specific micro-organism whose pathogenic relation to the disease can be proven.

There is no difficulty in finding germs in every pyorrheal pocket; there are always plenty present, and always pathogenic varieties in profusion. Take for example the observations of Friedrich Hecker who states that the following are the bacteria most commonly found:

1. Staphylococcus pyogenes albus.
2. Staphylococcus pyogenes aureus.
3. Staphylococcus pyogenes citreus
4. Staphylococcus pyogenes fetidus.
5. Streptococcus pyogenes.
6. Streptococcus viridans.
7. Bacillus pyocyaneus.
8. Diplococcus pneumonia.
9. Leptothrix buccalis.
10. Spirochæta refringens.

They are all disease producers, and most of them cause the formation of pus, but none is characteristic of pyorrhea, and their presence and pathologic action is very strongly suggestive of a secondary rather than a primary infection. One or another, several or all may be present in a given case, but none fulfils the postulates of Koch, nor for that matter has any other micro-organism fulfilled them to date. But that is not a valid argument against an infectious origin of some sort.

There are several diseases whose specific origin was suspected and insisted upon for years before the truth of such a claim could be demonstrated. For example consider syphilis; none doubted that it was of bacterial cause, but only in the last few years was the spirochæta discovered. Scarlet fever, measles, small-pox have no known cause, but few doubt that some day a specific germ for each will be demonstrated. Sometimes the failure has been due to the fact that the germs have failed to grow on ordinary media, and are themselves either so small as not to be visible with our finest microscopes, ultra-microscopic, as in infantile paralysis for example, or sometimes they are so large as to be overlooked; although this sounds paradoxical, it is practically true of the spirochæta pallida; the latter is so large and so easily demonstrable when one knows what one is looking for, that it seems extraordinary that it was overlooked so many years.

The same may be true of pyorrhea. Certainly there is under much discussion at the present time a micro-organism which is under suspicion, and with seemingly good grounds, of being the long sought specific germ. It is large, much larger than the accompanying bacteria, and it does not grow in the ordinary media under the usual conditions, so that the ordinary methods of testing are not available. It is not a bacterium at all, but belongs to the protozoa, or lowest form of animal life, as distinguished from the bacteria which are vegetable, belonging to the mycetæ, or fungi. It is called the *endamœba buccalis.*

Modern writers since the name was first proposed by Barbagallo and Casagrandi in 1879, and especially since the classical work of Schaudinn, have used the term *entamœbe,* particularly foreign authors, with our native observers following their lead. Allen J. Smith however, has pointed out that Joseph Leidy in 1879 first suggested the name *endamœba* for a parasitic amœba of the cockroach, and therefore from this clear priority of twenty years and for patriotic reasons this term should have our endorsement.

Amœbæ have been found as parasites, human beings as involuntary hosts, for many years. Lambl of Prague, probably first recognized them in the fecal discharges in 1860. It was in a case of diarrhea, but no importance was placed upon their presence as bearing any causal relation to the disease. In 1875 Loesch first accurately described these organisms, named them amœba coli, and successfully produced ulceration in the intestines of a dog by injection of infected feces. Several other observers, Cunningham, Koch, Grassi and others, found amœbæ in human dejecta, but under such varying conditions of health that much confusion resulted.

In 1886 Kartulis published a series of articles based upon his observations of dysentery in Egypt and the constant presence of an amœba. I can only speak of these from quotations and references, but it appears that he not only described the intestinal amœba, but also one found in connection with suppurating tumors of the jaw which bears some similarity to the endamœba buccalis, although Barrett in a critical study of the descriptions believes it to have been a different species.

There are numerous references in the literature for the next seventeen years, in this country and abroad, in which attempts were made to clear up the pathogenicity of this protozoan, but it was not until 1903 that Schaudinn definitely established the fact that there are at least two species of intestinal amœbæ, the one, the endamœba coli, a harmless parasite, the other, the endamœba histolytica, distinctly pathogenic, the specific cause of amœbic dysentery.

Since that time there have been recognized and differentiated at least seven different varieties of amœbæ which are parasitic in man. Of these in 1904 Prowazek described a species which he named *endamœba buccalis*, and in view of the clarity and completeness of his description this term is retained, although it is recognized that this organism is probably the same as the less perfectly noted *amœba gingivalis* of Gros in 1849, and the *amœba dentalis* of Grassi in 1879.

The *endamœba buccalis* is rather smaller than some other species, though varying in size from 6 to 32 micro-millimeters in diameter. It has a distinct clear outer portion called the ectoplasm and a granular inner portion called the endoplasm. The former is chiefly visible when the organism is in motion when it may be seen as hyaline and as a little more refractive. The nucleus is quite distinct, spherical or oval. According to Craig it reproduces by simple division and by multiple division, and according to Chiavaro also by encystment, which by establishing all of these methods of reproduction in the mouth, tends to prove the latter as its selected habitat rather than as a temporary location for stages of development. It is found all over the world; Craig has observed it in patients in the United States as well as in the Philippines, Chiavaro in Italy, and by others in various parts of Europe. It has long been free from any suspicion of evil doing. In 1911 Charles F. Craig after an exhaustive discussion of the "Parasitic Amœbæ of Man" says "There is no experimental evidence connecting *endamœba buccalis* with disease —so far as the evidence goes we must regard it as only a secondary invader of the tissues." Angelo Chiavaro as recently as July, 1914, in an address before the American Dental Society of Europe, reporting his researches upon this amœba, states as one of his conclusions that—"The endamœba (buccalis) has not a pathogenic action; on the contrary, as it feeds on bacteria, it is most probably an aid to the auto-disinfection of the teeth."

On the other hand M. T. Barrett, of Philadelphia, before the Pennsylvania Dental Society presented a strong indictment of the *endamœba buccalis* as the specific exciting cause of pyorrhea. He bases his case on the constancy with which he has found the amœba present in cases of pyorrhea, the like constancy of its absence in healthy mouths, and the effects of the treatment by a well established, apparently a specific, amœbicide. His answer to the conclusion of Chiavaro above quoted, as drawn from the ingestion of bacteria by the endamœba, is to point to the remains in the organism of leucocytes and red blood cells as indicating an appetite not so innocent as Chiavaro believes.

His work has been corroborated in every particular by Drs. C. C. Bass and F. M. Johns, of New Orleans, and may be tested out very easily by any of you at all familiar with microscopic examinations and technic. The gums over the pyorrheic pockets are gently pressed upon toward the free margins, thus expressing the contents. Some of the pus is collected on a microscopic slide, preferably warmed; a little warmed salt solution is added as a diluent, a cover glass is applied and the specimen examined as soon as possible; if within a few minutes, living organism will be seen, varying in size as above mentioned, from that of a leucocyte to one several times larger, and protruding one or two coarse pseudopods.

When seen thus in motion the clear ectoplasm is readily seen forming the pseudopod, the granular endolpasm extending little if at all into this temporary extension. If immediate examination is not practicable, smears should be made on the glass microscopic slides, dried and stained. Bass and John's technic is as follows: "(1) Spread the pus on slide; (2) fix with heat; (3) pour on carbol-fuchsine; (4) wash off at once; (5) stain with Loeffler's methylene blue ¼ to ½ minutes; (6) wash dry and examine with oil-immersion lens." With this stain the endo- and ectoplasm are well differentiated and the parasite can be differentiated from the much more numerous pus, epithelial, and other cells present.

My colleague, Dr. J. W. Sheetz, has found a number of specimens for me in this way.

We have examined a number of specimens and certainly the claim made of the constancy of the presence of this amoeba in cases of pyorrhea seems quite justified. We have not found it in any healthy mouths, but the number of cases examined has not been sufficient to justify any conclusions as yet. Chiavaro is the only observer I have found who claims to have found them in non-pyorrhetic mouths, but even he says, after having admitted that it "is found in the pus of all cases of pyorrhea alveolaris," that "it is generally present in the *materia alba* of the sound teeth if they are not kept in a good hygienic condition." Inasmuch, however, as uncleanliness has been admitted as one of the predisposing causes, the presence of the endamœba under these conditions may be considered very likely as a pre-pyorrheic stage, and thus this conclusion of Chiavaro's may be construed as a further support of Barrett's claims.

One of the most convincing arguments of the pathogenicity of the amœba to me, and one which I have not seen advanced as yet, is the very character of the pathologic conditions in pyorrhea. The harmless *endamœba coli* simply exists on the surface or mixes with the intestinal contents.

The pathogenic *endamœba histolytica* brings about a necrosis of the mucous membrane and the sub-mucosa, causing a chronic, sluggish ulcer, along the floor of which are found the amœba on the advance lines of the disease process among the dying and degenerating cells, leucocytes, red blood cells and secondarily infecting bacteria.

This is the condition found wherever pathogenic amœba gain an entrance; a slow chronic process, characterized by necrosis and secondary infection, and seems typically shown in the presence of the *endamœba buccalis*—not only in pyorrhea but also very recently by Smith, Middleson and Barrett conjointly in the cheesy purulent material extruded from the crypts of chronically diseased tonsils.

Eugene S. Talbot, of Chicago, writes to protest against Barrett's claims; he states that Miller said there were 150 varieties of germs in the mouth, and why, therefore, pick out one to the exclusion of the remaining 149; that the bacterial germ origin of pyorrhea has never been proven, and then with the characteristic inconsistency of human nature, especially prejudiced human nature, he goes on to say that "the pus is nearly if not always associated with calcic deposits—remove that and the pus is destroyed without a germicide," etc.—going on to argue on just the same sort of premises and drawing the same sort of deductions in favor of his pet theory for which he criticises Barrett and Bass and Johns.

One may answer Talbot's first argument simply by reminding you of the fact that of all of the parasites found in the mouth the endamœba seems to be the one constantly present with pyorrhea, and as constantly absent in healthy conditions. Second, as to the germs *versus* deposits one may say that with the exception of a few chemical substances, the presence of the pus means the presence of germ activity. Mechanical irritation in the absence of infection does not produce pus.

PATHOLOGY

I have already taken up so much of your time that I must give only the briefest consideration to this subject. You are doubtless more familiar with the ordinary dental aspects of it than I. The process is essentially a low grade inflammatory condition, involving primarily the peridental membrane, extending to the alveolar walls, causing degeneration, necrosis and atrophy, with resultant loss of tissue; it is *not* an *absorption* as is so often asserted, and which is strictly speaking a solution and taking up into the tissues, but a destruction of the walls and a casting off in the pus discharge. There results from this dissolution of the supporting tissue a loosening of the teeth *pari passu* with the advance of the process, until they are lost completely when the disease abruptly terminates. This last characteristic is further supporting evidence for the infectious origin of pyorrhea, for we constantly see in surgery the opening and free drainage of a pus cavity promptly followed by its cure.

Secondarily there are results more far reaching, pregnant with possibilities of evil to the patient, and which constitute pyorrhea as a serious menace to the health or even life of the individual. It is these but recently appreciated potentialities that claim the attention of the medical profession.

The dead and the dying cells from the primary mischievous influence or influences provide an inviting culture medium and an ideal retreat for bacteria of many kinds, where multiplying and lying in wait, undergoing transmutations, they are full of evil possibilities. The pneumococcus here may gather and multiply, increasing in numbers and virulence until the general systemic resistance is lowered by exposure to some sudden chilling, and an attack of pneumonia occurs. The tubercle bacillus may work its way through the break in continuity in the peridental membrane into the lymph spaces and thence to the cervical glands, causing tuberculous adenitis, and thence perhaps to a general systemic invasion. The staphylococcus may follow the same course, giving rise to abscesses of the cervical glands and widespread damage. The streptococcus may alter its type and virulence, and, gaining entrance to the circulation, excite serious lesions according to its newly acquired affinities in the arthritic tissues, on the heart valves and elsewhere. The continued absorption of toxins from the pus pockets, with the seemingly slight but fairly continuous oozing of minute quantities of blood, lead to definite and often serious anemia. The swallowing of bacteria and their products with the food, inevitable from the mechanics of mastication which force out the contents of the pockets with almost every masticatory effort, leads to infected food stuffs in the gastro-intestinal tract, with consequent well marked disorders of digestion, and even to gastric ulcer. These are no longer idle speculations but definite consequences which may occur in any case of pyorrhea, and the interest aroused is already bearing good fruit.

Hartzell and Henrici have reported their studies to determine "the therapeutic value of eliminating the mouth infections in selected cases of systemic disease," some very striking results. They prepared autogenous vaccines from the pus pockets and gave local treatment to the mouth, and report as follows: In 17 cases of arthritis deformans the consequences were irregular, but marked improvement in over half of their cases. In 7 cases of endocarditis, two were vastly improved; in three cases of pernicious anemia, five cases of gastric ulcer, nine cases of iritis, benefits were apparent, especially striking were they in the gastric ulcer.

TREATMENT

I believe the condition is absolutely a surgical one, with medical treatment as an auxiliary aid.

There are two classical positive surgical principles in the treatment of suppuration anywhere in the body, where possible; first and foremost the free evacuation of the pus, second, the removal of local sources of irritation; with the modern addition of a third, the auxiliary constitutional treatment to raise the systemic resistance by the production of immunity, or remove any systemic predisposing cause.

Thus the first indication after the pus flow is established is surgical with all that that implies, including the evacuation of the pus, antiseptic applications, cleaning out the debris, the removal of deposits, the correction of mechanical sources of irritation whatever they may be. No matter what has been or may be discovered for the specific constitutional treatment, if it be infectious whether from the endamœba or what not, the opportunities for infection are evidently so omnipresent, that unless all such local conditions are corrected, re-infection is bound to occur.

Next, constitutional treatment; while the prepared specific treatment which I shall mention in a moment is still *sub-judice*, one should always look toward the correction also of any constitutional predisposing causes if present. Thus of course, diabetes, tuberculosis, neurasthenia and the like should have proper medical attention. I am not so sure as to the so-called rheumatic diathesis; there may be grounds for considering that a result rather than even a predisposing cause of the local condition.

The next is the specific treatment, and this has aroused a very great deal of interest. Acting on the hypothesis that the endamœba was the specific cause of pyorrhea, and having in mind the extraordinary amœbacidic action of ipecac and its active principle emetin, introduced by Rogers in 1912, Barrett and independently Bass and Johns began the use of this drug, and claim remarkable success. They reported the prompt disappearance of the amœba with extraordinary improvement in the local conditions.

The ordinary local treatment is applied as usual. The question of regeneration in the peridental tissues depends upon the extent to which they have been damaged. Certainly unless it occurs or until it occurs eternal vigilance must be exercised to prevent re-infection which otherwise is sure to occur, and often does occur anyway. Repeated examinations of the material from the pockets should be made from time to time and if endamœba reappears the emetin should be repeated. Realizing the very great likelihood of re-infection in spite of the greatest care, Bass and Johns advise repeating the three-days course of emetin anyway as a prophylactic, every three or four weeks, for two or three periods at least.

During the past year this treatment has had great publicity and probably a very wide trial. I do not think, however, always a fair trial. I say this because of the wide diversity of results apparently obtained. Some practitioners have written enthusiastically of the benefits, while others have minimized them or actually disparaged the use of the new remedy altogether. Evidently the personal equation is an active factor as is so often the case, and time alone with a more thorough working out of the exact technic will enable us to appraise this treatment at its true worth.

It seems to me, however, only fair to insist that one should not expect too much from the use of emetin; one has no right to expect miracles. We may have an analogous condition in the treatment of tuberculosis. Suppose that a specific is found which absolutely destroys the tubercle bacillus in the human body; in early cases of single infection this substance would promptly and effectively cure the patient. But given a case of mixed infection, of perhaps cavity formation full of broken down tissue, mixed with organisms of all sorts, would the specific cure such a condition? Not at all; undoubtedly it might help matters to some extent but the mixed infection still remains.

So in many cases of pyorrhea, in fact the most advanced ones, assuming for the sake of argument that the endamœba is the exciting cause, the use of emetin may remove the endamœba but leaves countless other organisms thoroughly capable of carrying on the morbid processes.

Therefore, I say that this new treatment to my mind has not had altogether a fair scientific trial, and is in danger of being discredited as a result. Some practitioners have given it as per directions on the package and omitted adjuvant treatment. Sometimes they get remarkable improvement, sometimes no benefit at all, and they become perplexed and dissatisfied.

Others, advanced operators, using thorough surgical or prophylactic treatment, try the emetin in conjunction with their present efficient methods and claim perhaps no marked benefit. This side of the question could only be answered after a longer trial. A careful compilation of cases would be necessary and results tabulated to see whether or not the average length of treatment of the cases was affected; whether the pathologic conditions averaged as severe as in cases in which emetin was not used; whether recurrences were as likely, etc., etc.

So the question is not a simple one to be lightly dismissed. I hesitate to discuss this question of treatment, but being cognizant of the possibilities for evil of some of the amœbæ elsewhere, and knowing the specific action or emetin toward this organism, I cannot but cry a warning for the possibility of dangers of over-enthusiasm on the one hand, and the unfair discrediting of a possibly useful drug on the other.

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ROOTS AND THEIR TREATMENT*

BY WALTER F. PROVAN, D.M.D., BOSTON, MASSACHUSETTS

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INSTRUCTOR IN ROOT CANAL TREATMENT AT HARVARD DENTAL SCHOOL.

THE SUBJECT OF MY PAPER this evening is "Roots and Their Treatment." I shall endeavor to show how, in my practice, I have tried to solve this very important problem.

It seems to me that, on account of the very uncertain number and complex conditions of roots and canals, it ought to be taken as an axiom that the radiograph should be employed in all cases where treatment of these roots or canals is to be carried on. Without a good X-ray picture we can only conjecture at conditions surrounding the root apices, and even with long experience we must, in the nature of things, make many mistakes in diagnosing these cases simply by external symptoms. A sinus may discharge several teeth away from the root on which the infection is located, and it is only by a good skiagraph that this condition can be located and quickly traced. It will also show the feasibility of treatment or non-treatment, where the area of absorption is merely a rarified space in the alveolar process, or an actual hole into which the root end is projecting.

With the rapidly growing understanding of the grave systemic infections which can and do arise from these periapical infected areas, it seems to me that it is nothing short of criminal to handle the treatment of root canal and alveolar abscesses in a slipshod and careless fashion, with unsterile broaches and pieces of dirty cotton, without the use of the rubber dam, and with as little time as is generally used. If our patients knew as much about these conditions as we ought to know, I believe that it would not be long before the man who cures (?) abscesses without ever seeing the conditions present at the apex of the infected tooth, would be out of a job. Because a tooth has stopped aching is no proof that the infection has been cleaned up, and many a quiescent tooth which has been treated for periapical abscess by some one of the numerous abscess cures on the market is the most dangerous thing that the patient has in his or her anatomy. The area still persists as can be seen by the X-ray, and the blood stream carries the infection away to help swell the troubles of the system in the form of endocarditis, arthritis, or some gastric infection which, in the great majority of cases, is not traced back to the original focus of infection. It is as useless to try to clear up these troubles until the primary cause is removed as it would be to attempt to dry the sidewalk with a mop during a rainstorm.

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*Read before the Harvard Odontological Society, April 20th, 1916.

Where there is no rarified area, when one has a good picture of the tooth to be treated, he can measure the length of the root and tell just how far his broach must go to get to the apex. One good method is to open the canal as far as possible without danger of perforation and seal in a sterile broach or piece of wire; then take your X-ray picture; then if there is distortion in the film, the length of the sealed-in broach is to the apparent length of the broach in the picture, as the length of the root is to the apparent length. Having the length of the root, there is not much difficulty in enlarging the canal safely so that a carefully-measured canal point can be forced to the apex, not through it. While it may be possible that a sterile gutta percha point forced through the apex will be tolerated by the surrounding tissue, it is not a natural condition, and I believe that the nearer we come to removing only what is pathological and leaving the parts as nearly in a condition of normality as they were originally, the better our cases will turn out. I use graduated Kerr root files, (not reamers) to open the canals. Beginning with the very finest I gradually use larger and larger ones, till I have opened up to the required size. Peroxide of sodium in the canal with sterile water during this filing process will leave the root very clean. Push the file in till it engages with the side of the canal, take one turn and draw back, wash the file in either H_2O_2 or concentrated benzoic acid solution and again place in root canal. It is surprising how quickly and well the root canal can be cleaned in this way. By my picture I can tell how far my file must go before it comes to the apex. In curved or malformed roots, which can be filled, the fine file will follow the curves if used as above, and will not perforate the side of the root; the next sized file will follow the first, etc.

For devitalizing teeth I use in most every case novocain injection. There is little difficulty with the upper teeth, but I have found that in cases involving the lower jaw it is quite often a fact that the teeth are not anesthetized sufficiently to get to the pulp. I believe that this is not the fault of the novocain, but is a fault in the placing of the needle. It is often quite difficult to follow the technic given for mandibular injection, as to injecting one centimeter above the last molar. Many times the last molar is missing. I have adopted a method which seems to bring almost uniform success, and that is to find the external oblique line, then after preparing the mucous membrane with iodin, I find the angle of the jaw on the outside with my finger and note the tragus of the ear; half way between these two points in a vertical plane is the point of entrance for the needle. Then follow back just a little way from the bone, to avoid injury to the periosteum, until the needle comes against the inwardly curving, ascending portion of the ramus, withdraw slightly and inject according to the technic given in the textbooks. By this means we have a visible guide always. Sufficient anesthesia will be obtained to extract the pulp in almost every case, and where it is not obtained and a second injection is not to be used, a novocain pluglet and pressure will solve the difficulty.

Where rarified areas or actual holes exist in the process, it becomes a question of judgment when to treat medicinally and when surgically. I believe that medicinal methods, with the possible exception of ionic medication, will not succeed when there is a large rarified area. When there is an actual hole, with the denuded root apex extending into it, surgical treatment is the indicated procedure, either extraction or apicœctomy must be resorted to. The end of the root in these cases is almost always encrusted with a greenish or greenish-brown deposit, and this will act as a further irritant in spite of the best medicinal treatment. When a tooth is extracted it can not be gainsaid that the cause of the infection is removed, but when removed something must be put in its place, either a bridge or a plate. Now, most people do not want to wear plates, and small plates and removable appliances are a source of danger. They might come loose and be swallowed and choke the patient, to say nothing of lacerating the gums and soft tissues in case one was loosened and chewed upon. The great majority of bridges are nothing but garbage cans and filth collectors; and besides, good adjoining teeth must be mutilited to put them in place. This makes an artificial condition. The abutment teeth are fixed firmly together and lose the individual motion which is normal to them. Also a great many operators devitalize their abutment teeth, which enhances the chance of the patient to acquire more rarified areas. In apicœctomy or root amputation, we clear away the area and root and leave the natural tooth in place. It has been said that teeth so treated would in the course of years, eight or ten, be lost through absorption of the root. We would at least then have put off the wearing of plate or bridge eight or ten years. Of course all roots are not fit subjects for amputation. Also the condition of the patient must be taken into account. A natural tooth crown, however, is a far better crown than any operator can make, and there is no irritation at the gum edge to cause pyorrhea and systemic infection, through ingestion of pus. If a tooth has sufficient alveolar process remaining, and there is a chance to get at the root end, I think the patient is better served and the pathological condition more quickly cleared up by root amputation or curetment than by the needlessly prolonged course of treatment heretofore carried on, to say nothing of the better conditions arrived at immediately by the removal of the infected tissue.

The dentist of today has a far broader field to work in than the mere plugging of carious cavities. His patients are sent to him often from physicians who have "seen the light," and understand that infections of the oral cavity are responsible for many of the conditions which have been treated blindly up to the present. When the leading men in the medical ranks see this thing it seems to me that it is up to us dentists to be in position to properly care for patients who may be suffering from lesions in or about the teeth and gums, and to give them real service in clearing up these conditions. Many cases are constantly seen in which dental treatment is considered finished, and yet which, on examination, show those poison spots at the apices of crowned and treated roots. Many also have sinuses with pus running on the gums, and yet these are passed over as little "gum boils," to be let run.

I know that the excuse for this often is that we cannot get the public to understand the necessity of this modern treatment, and that patients will not pay the necessary fee for the time required to treat these conditions properly. It seems to me that this condition is a disgrace to the profession. There should be some method by which the general public could be made aware that honest, modern, efficient dental service is worth more than the cost of a shave and haircut; and the dentist should master his technic so that he can be in a position to give this class of service worthily when the opportunity presents itself.

When the radiograph shows conditions which warrant amputation, the necessary instruments should be thoroughly sterilized and placed close at hand. The instruments that I use are two sharp lances, one curved and dull on the convex side, and the other an ordinary scalpel and gum lancet, a pair of cotton pliers, a large, sharp, round bur, a pair of small scissors, and a pair of pliers notched at the end, for holding tissue which it may be necessary to cut away. A curette is necessary, but the curettes for sale at the dental depots are too large; so I use either Nos. 2 or 3 eye curettes or one of Black's straight spoon excavators, No. 33. A very fine sterling silver eye probe is also useful, for it is soft and will follow a pus pocket or sinus well. Some sterile gauze sponges or cotton pledgets are necessary to wipe blood from the wound. It is well, also, to have some sterile silk for sutures, with curved needles; the straight cannot be used in this situation. I use twisted silk No. 5. A tube of Johnson & Johnson's iodoform gauze five per cent., one-half inch wide, put up in glass tubes, also is necessary. These articles with a bottle of tincture of iodin and some Dobell's solution or sterile water for washing out the incision are all that are required.

For the operation I use conductive novocain anesthesia. The root canal may be filled either before or at the time of the amputation. If it is done at the time of the amputation extraordinary care must be used to see that it is perfectly dry. After the anesthetic is administered, and feeling has left the parts, I paint the area to be opened with tincture iodin; then with my curved lance I make a crescent-shaped cut large enough to expose my field well. I have the convex of the crescent toward the gum margin. This allows me to hold the wound open with a sponge or with a pledget of cotton with my left hand while I am operating. Next, cut through and turn back the periosteum. This can be done with the straight Black excavator. If there is a sinus discharging on the gum it is well to have your crescent include this; that is, have your incision run through the sinus. If there is a sinus, after reaching the bone and turning back the periosteum, all that is necessary is to break down the overhanging edges into the absorbed area with Black's instrument. The sinus will give you your entering aperture. If there is no sinus, measure by your X-ray picture and go through the alveolar process to the diseased area with the large round bur. Bleeding will be profuse at first, but as we proceed this generally subsides. When the infected area is exposed, the extent can be noted and amputation or curetment of the root can be accomplished as the case requires. The opening should be large enough so that thorough vision can be had, and so that all diseased tissue can be reached and removed. Sometimes little pockets will open out of the main area, and all of these must be followed and cleaned out. Thorough surgical curetment is necessary. If the root end projects into this area, cut it off flush with the healthy border of the absorbed area and smooth its edges. It is not necessary to do much rounding off as this causes just that much more damage to the pericemental membrane, and the more this is damaged the greater the risk of loss of the tooth. It is well to bear in mind that the greater the surgical damage the longer it will take the parts to heal, and therefore, while making your first incision and consequent opening into the bone large enough to expose all diseased parts, do not make it any larger than is absolutely necessary. This will vary with circumstances.

Having curetted thoroughly and seen to it that our root filling is smooth, we can wash the wound with Dobell's or Lugol's solution, paint with tincture of iodin and either pack with iodoform gauze, not too tightly, or sew up. If I am to fill the root at the time of amputation, I do it at this time, and as follows: Stop the bleeding and clean out the canal; then place a piece of sterile cotton in the incision and against the amputated end of the root; flush the canal with acetone and dry with a canal dryer. Sometimes I use a solution of thymol and acetone. The root can be filled now with any of the hard root canal fillers. In the molar teeth or in roots to be crowned oxyphosphate of copper cement makes a very good root canal filling. Mix to a creamy consistence and place in the root canal, then with a piece of soft vulcanite rubber press it down till it blackens the piece of cotton in the wound; let it harden and burnish the projecting filling at the amputated end of the root. This will discolor the root or tooth so it can be used only where discoloration is of no consequence. In anterior teeth or where I do not wish to use oxyphosphate of copper, I use a gutta percha point dipped in chloroform or in a chloroform and rosin solution. This can be passed into the canal and pushed up until the tip projects into the wound; then grasp this tip with pliers and pull the point as far through as possible. Make it fit tightly, then with a root-filling instrument pack the gutta percha down hard in the canal; add what is necessary to fill up the canal. The projecting tip can now be cut off with a hot instrument and the gutta percha smoothed off.

It is well to remember that infection may spread sideways in the canal; so when cleaning it ream it out well so that the lumen of the canal is enlarged to a size that the large root canal points will just fit tightly when pulled home in it. When this point is reached, wash out your wound; and then I prefer to pack lightly with iodoform gauze. In my practice these cases have done better than the ones I sewed up. The packing should be changed at least every other day, and can soon be left out altogether, The wound will fill in from the bottom if all is well. I have seen teeth which have been loose and sore before amputation tighten up and become perfectly useful members of the masticatory organ after operating. The soreness will all disappear.

By way of closing my paper I would like to say a few words about interpreting X-ray pictures. It must be borne in mind that these are not photographs of the actual objects themselves, but are shadows of different density thrown on the film. These shadows represent the degree of opacity to the ray that the different conditions in the bone present; also the plane that the picture is taken in will make a great deal of difference in what will be shown in the film. The picture will not lie, but it can be readily seen that if you hold two pencils in line perpendicularly and place a white screen behind them, then throw a light from the front that we will get only one shadow, while if the screen is placed to one side and the light thrown from the other side, we will see two shadows. If there is doubt take two pictures. A good idea of how we have to use one of these pictures in operating, would be to imagine we have a room with furniture in it with a ground-glass screen for one wall. A light being allowed to shine across the room would throw shadows of the furniture on the ground-glass screen. If we could now take a picture of the screen we would have an illustration of an X-ray picture of that room. The shadows will of course be superimposed and this is exactly what we get in the skiagraph.

I am a true laborer: I earn that I eat, get that I wear; owe no man hate, envy no man's happiness; glad of other men's good, content with my harm; and the greatest of my pride is, to see my ewes graze and my lambs suck.—"*As You Like It.*"

"RENDER UNTO CAESAR"*†

BY S. N. YOUNG, D.D.S., CINCINNATI, OHIO.

INSPIRATION

IN RESPONSE to an appeal to the younger members of the profession from a senior member of the Ohio State Dental Society at the recent meeting at Columbus, Ohio, and with sincere appreciation of the accomplishments acquired by our seniors through their years of untiring efforts to conserve and to promote the health and happiness of their clients, and for the welfare of their profession, this contribution is offered with a hope that it may let a ray of light fall upon one of our darkest problems.

SUBJECT

The subject to which I wish to refer is that of our unsolved problem, pyorrhea alveolaris, with its associated maladies, rheumatism, gout, etc.

The purpose is to introduce a theory of the probable basal cause of this disease, a theory which I have been unable to find mentioned in any literature, old or new, relating to this perplexing problem.

Since I have not the time or opportunity to prove or disprove conclusively the actual merits of the theory, and because of its simplicity, and of need of light upon this subject, the theory is offered in the form of a suggestion, so that those who are investigating along this line may make such observations as are necessary and record its merits, if any be observed, in due time.

THE NECESSITY OF AN IDEAL

"In the beginning God created the heaven and the earth." "The word of the Lord came in a vision saying, 'I am thy shield and thy exceeding great reward'." (Genesis).

Whether the above statement and promise be true, we cannot, during our state of mortality, comprehend; but to accomplish greatest possible attainment during our earthly pilgrimage, we must have an ideal or standard upon which to work, and that ideal must be above and beyond probable earthly acquisition; and so we accept this promise of our religion, the hope of future appreciation and reward, as our supreme incentive.

To make successful earthly venture, we know that we must have our ideal or basis from which to work. The professional man must have his education, and the higher the educational accomplishment the greater the

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*Read before the Cincinnati Dental Society, April 30, 1915.

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possible attainment. The business man must have his capital or its equivalent in "brains" or "nerve"; and Christianity has its highest conception of sympathy and love, and if one fail, it is either because his ideal is false, or because he has drifted away from it.

NATURAL BASIS FOR STUDY

In our professional capacity, wherein we are called upon to study the infirmities to which mortal flesh is heir, we seem to have accepted as our basis for investigation in all pathological conditions, the microscope and the germ theory.

I often have wondered if this basis is not a false one, if we have not given more credit to the germ theory than it really deserves; if our enthusiasm along this line does not get the best of our good judgment at times, and lead us away from probable larger and greater facts, and if it would not be better if we would restrain our enthusiasm within the bounds of reason, and go farther back into the life's history of the particular animal organism with which we are dealing, and search for a possible gross cause of an infirmity before resorting to the microscope.

Go back to the very beginning, to the primitive man in his natural environment, and observing natural laws, take for our basis of study this perfect harmonious organism, this masterpiece of creation, to begin our search for truth.

Say now, for instance, in the disease tuberculosis, in which all credit is given to the bacillus-tuberculosis, and treatment directed along this line through administration of basal nutrition with the idea of building up strength for resistance; would it not be more rational to go a step farther back and search as well for some fault, some habit, some persistent indiscretion, which is bringing about an abnormal waste of energy or natural resistance, and make effort to remove or to correct that condition first, and to conserve, as well as to restore this natural resistance to disease? For, after all the bacillus tuberculosis may be only nature's method of removing from the organism that which is a detriment to its welfare. We have one such good example of nature's foresight, as we shall see later on, in the office of the colorless corpuscles.

Observations along this line might reveal the fact that tuberculosis is after all only an infarction, instead of an infection, and that the infarction has taken place previous to the time the tubercular bacillus was called into play, or that this bacillus was selected by nature to remove a detrimental area which because of lowered nutritive tone, could not become reorganized.

I have personally known of several people afflicted with this disease, recovering in some cases from seemingly hopeless conditions by a correction, providentially or otherwise, of unnatural habits and without any particular attention being given to the nutrition or to environment.

We must not, however, underestimate the destructive influence that the microorganism undoubtedly exerts in many pathological conditions, for it matters little whether it be germ, micro-organism, chemical reaction or reagent, or just common dirt, so long as its destructive influence is recognized, but to endeavor to give credit where credit belongs, observing the rule of "safety first" under all circumstances.

THE IDEAL OF DENTISTRY

Normal man in his natural environment, as we know, is an organism of physiological perfection, and so-called "improvements" (conceptions of the human mind), never have been of benefit to his physiological welfare.

The profession of dentistry always has been willing to recognize this fact, and has accepted for its standard the normal human being, believing that in this masterpiece of superhuman creation we have a perfect ideal, that there is no anatomical part that may be considered superfluous, and that is not required in order to bring about physiological completeness.

That is why this profession is striving day after day, to bring about a healthy condition of the mouth, and to retain for its clients as nearly as possible the natural masticatory apparatus, in order that the function assigned it by nature, that of insalivation of vegetable food, or that food which requires the aid of the ptyalin ferment for complete digestion, might be performed.

NATURAL HEALTH LAWS

Of the laws of nature by which all living things are governed, and which all must obey in order to maintain perfect health, namely; heredity, environment, nutrition and reproduction, that of nutrition is of special interest to us in this particular study, so we will pass these four laws by for the present, with a few brief remarks, and take up the problem of nutrition later on.

The law of heredity teaches that the normal child is the product of a mutual desire between normal male and female for offspring.

In natural environment we find man in the open air with the entire surface of his body, as in all other forms of animal life, completely aerated.

Nutrition finds fresh food to eat, and water with its mineral salts, for drink.

In reproduction we find a provision of nature designed for perpetuation of a species, and not a creation for pastime.

CONTRARINESS OF CIVILIZATION

It might be well to mention a few of the characteristic habits of civilized man that are directly opposite to that which nature intended them to be.

In regard to reproduction little thought is given as to what effect certain influences might have upon the offspring, and the offspring itself is in many cases the product of other than mutual desire.

He houses himself so closely that it is impossible for the fresh air to circulate about him and clothes his body in such manner as to indicate a sacrilege if fresh air should come in contact with more of his epidermis than that which covers his handsome countenance.

In taking his nutriment he usually does the directly opposite or unnatural thing of bolting that class of food that should be masticated, and chewing that part which does not require insalivation, and of all animal life man is the only one that will ingest his food at a temperature sufficient in extreme to produce symptoms of inflammation.

In his reproductive habits the average civilized human being is without doubt below the level of any other form of animal life.

Then after becoming afflicted with all manner of disease he brings into play his unnatural instrument, the microscope, and begins his search for something upon which to lay the blame, and so he finds the germs, and with the germs he makes his vaccines to apply in treatment in anything but a natural manner.

This custom has been carried to such extreme that we now find ourselves going down into the excreta of the diseased organism to find the necessary material with which to treat our rheumatism, and in our own practice of dentistry we now take our sterile instruments and go down into the filthy pyhorrhea pocket, take out the muck that is repulsive to the meanest of us, and make our vaccine through anything but a process of sterilization, and inject this vaccine into living human tissue for the treatment of a disease of doubtful origin, after all our years of preaching the necessity of sterilization, and in the face of statistical facts that tell us that in the early period of the smallpox vaccine, when a similar process was employed, many innocent people were inoculated with the most loathsome of all diseases, in this very manner.

PRIMITIVE EVIDENCE

From prehistoric specimens of primitive life, in our museums, we find evidence of man's having been able to live to an advanced age, by observing a few simple natural laws, without any aid of science whatever.

These people most probably indulged in few of the habits common to civilization today, except, as a fractured skull found occasionally would seem to indicate a tribal difference, lack of domestic felicity, or other equally harmless pastime.

They were certainly not gifted in the art of scientific food preparation that is practiced by our fellowman, and, what interests us most in this particular study, is the fact that there is so little evidence of dental disorder, especially among specimens of the species known to have subsisted upon omnivorous diet.

Occasionally we find a decayed area, or a tooth may be missing, but in most cases the teeth are strong and show evidence of much useful service, and their supporting osseous tissues also give evidence of healthful harmony.

This evidence, therefore, would seem to tell us that in order to find the true source of the dental disorders existing at the present time we must search for it somewhere among the habits common to civilization, or rather among the habits of the particular organism itself.

DISEASE IS UNNATURAL

Taking as a basis the primitive man in his natural environment, and with knowledge of the four laws previously mentioned, we will say that most of the diseases that are visited upon the civilized being today are the result of ignorance of, or disregard for, one or more of these natural health laws.

Applying this idea to the problem of dental diseases we find our subject reverts to the law of nutrition mainly, and here in the original man we find that the nutrition was not only uncooked and coarse, but was ingested at a natural temperature, which latter fact we wish to call attention to as being fully emphasized in all animal life today, where the habits are still under the guidance of nature.

NEW THEORY FOUNDED ON OLD LAW

It has long been recognized that the artificial preparation of food is largely responsible for tooth decay; that the mastication of coarse, natural food supplies the friction necessary to keep the teeth clean and practically free from decay, and the other oral tissues in a comparatively healthy condition. And my belief, which was formed after many unprejudiced observations, is that it is the unnatural presentation of food that is the great factor in the cause of pyorrhea alveolaris, and to a certain extent, of its closely allied diseases, gout, *unexplainable* cases of "rheumatism," etc. Or perhaps it would be better to say that my theory of the cause of these diseases is founded upon the old chemico-physiological law that all organized tissue, vital or nonvital, is capable of being destroyed, i.e., reduced to simpler chemical compounds, by the influence of heat; the amount of reduction of course depending upon the degree of heat applied, and in vital tissue upon other factors that have contrary influence, such as habits of the organism which have, as result, the throwing off rapidly of systemic poisons, nutrition which supplies new power of resistance, conservation of physical strength, etc.

REVIEW OF ANIMAL STRUCTURE

In our study of animal structure we find it is made up of inorganic and organic compounds. The inorganic compounds consist of water and such salts as chlorides and chlorates, phosphids and phosphates of sodium, calcium, etc. The organic compounds or compounds of carbon, are of two groups, non-nitrogenous and nitrogenous compounds. The non-nitrogenous group embraces the fats, the carbonates, and the simpler organic compounds. The nitrogenous group contains the proteids, such as albumin, albuminoids, etc.

Because of lack of literature upon this subject along the line we wish to follow, and for want of equipment and time necessary to work out the problem, including the inorganic and non-nitrogenous groups, we will refer only to the nitrogenous group, which seems to have been studied to some extent but not with the sense of practical application in the study of pathology.

However, we will be reminded of the fact that heat also influences chemical reaction in inorganic as well as in other chemical compounds, and it is not unreasonable to suppose that excessive heat applied to living organized tissue would induce unnatural chemical changes among the elements of the two former groups, as well as to produce destructive effects upon those of the nitrogenous or proteid group, albumin, myosin, and casein.

PROTEIDS

"The proteids are the most important substances in animal and vegetable tissue. None of the phenomena of life occur without their presence, and although it is impossible to state positively that they occur as such in living protoplasm, they are invariably obtained by subjecting the protoplasm to analysis.

"They are highly complex compounds of C. H. O. and P., occurring in a solid viscous condition, or in solution, in nearly all the liquids and solids of the body.

"A certain amount of soluble proteid is absorbed from the food unchanged by the intestines; thus after digestion of a large number of eggs, egg-albumen is found in the urine.

"Proteoses are intermediate, and peptones the final product of the action of the gastric juice on native proteids. They are not affected by heat.

"When peptone (including proteoses) is injected into the blood stream, poisonous effects are produced, the coagulability of the blood is lessened, the blood pressure falls, secretion ceases, etc.

"Peptones and proteoses are absent from the blood under all circumstances, even from the portal blood during the most active digestion.

"We find then, that during absorption the epithelial cells of the intestines change the proteids of proteolysis back once more into native proteids, (albumins and globulins)."—Kirk.

This is the logical reason why the vegetable diet is best during intestinal disorders, when the epithelial cells of the intestines are unable to properly convert the peptone back into the native proteids, and a portion of the poisonous peptones become absorbed.

THE ANIMAL CELL

Referring now to our microscopic basis of study of animal life, the animal cell, we find in the blood and soft tissue with which this subject deals, that the cell is made up mainly of protoplasm. Chemical analysis of protoplasm shows this substance to contain water to the extent of three-fourths of its total weight, and porteids the most constant and abundant of the solids. This proteid or albuminous substance consists of C. H. N. O. and with S. and P. in enormous quantities, and also traces of Fe.

BLOOD COMPOSITION REVIEWED

Liquid blood is made up of plasma and corpuscles. It contains cellular elements similar to other tissue except that its cells are more widely separated by large quantities of inter-cellular fluid, the blood plasma.

The plasma, the most abundant element of the blood, contains the untriment for the tissue cells, and in this nutriment the nature of the food ingested controls temporarily the amount of the proteid percentage. The plasma also is a richly albuminous fluid, containing proteids, extractives, and salts. Of its ten per cent. of solids eight per cent. are proteid in nature, and the formation of a solid proteid from a soluble proteid fibrinogen is the essential act of coagulation.

The next constituent in abundance (40% of the total weight of the blood mass) we find in the red corpuscles, and the most abundant constituent of the red corpuscles, called hæmoglobin, is a proteid-like substance. The hæmoglobin and oxyhæmoglobin both give the reaction of proteids, but differ from other proteids *in containing iron*, and *in being crystallizable*. They form compounds with gases, and their function is that of conveying the gases of the blood.

THE COLORLESS CORPUSCLES

In the colorless corpuscles we find the great example of foresight on the part of nature in providing a means of adjusting irregularities that have resulted from penetration of the epithelium, the natural protecting cover of the organism, by substances that are inimical to the vital welfare of the organism, i. e., the adjusting of injuries that occur beyond the power of possible control of the organism itself.

We find these defensive microorganisms circulating through all the tissues, destroying deleterious substances in the blood, and by their power of amœboid movement, penetrating the vessel walls, in response to the unexplainable call of "chemotaxis" making way for increased nutrition, when such increase is required.

They are nature's first aid at all times in all forms of injury, surrounding immediately the irritant or injured area, endeavoring to eliminate or to render harmless such irritant, striving always to defend the vitality of the master organism.

If the demand is but for mild service, after such service is performed they return to the blood vessels in their natural form. If the demand requires more energy they may lose their identity and become pus corpuscles, with power to dissolve tissue in order to make an outlet for the elimination of the irritating element, or if unable to accomplish effective results in this manner, they may become changed into more forceful forms of micro-organisms or chemical poisons and make further demands until the desired results are accomplished and normal conditions are restored, or until somatic death occurs. But one noticeable fact is that whenever their natural function is completed, i. e., the injurious substance is removed, their action as a phagocyte ceases automatically.

We have this example presented to us frequently, when, after the removal of the hopelessly affected pyorrhea tooth, we see the symptoms disappear, and the tissues remaining resume a normal tone again.

In injuries where hemorrhage results, we find the colorless corpuscle called upon to furnish the substance necessary to bring about the clot formation which prevents the loss of this vital fluid.

We find in the colorless corpuscle also a typical animal cell, with the usual protoplasm with its proteid and other organic and inorganic constituents, and consequently susceptible to the destructive influence of excessive heat.

LYMPH

"Lymph is the exudate of the nutritive elements to the tissues and the collection of waste cell products. It is formed by pressure filtration, by osmosis, or by the activity of the endothelial cells of the capillaries. It resembles blood plasma in composition, only it is more diluted in so far as its proteid constituents are concerned, due to the fact that the proteids do not readily pass through membrane. It contains colorless corpuscles which are called lymphocytes and which become leucocytes after they have entered the blood stream.

"The lymph is collected by the lymphatic vessels, commencing in the small lymph spaces and capillaries, and is carried to the veins to continue its cycle through the blood again.

"All lymphatics pass through the lymphatic glands or nodes, which are the factories for the colorless corpuscles. 'Lymphocytes' also pass into the lymph stream wherever lymphoid tissue is found. In adenoid or lymphoid tissues the meshes are occupied by lymph corpuscles which, in certain foci like the tonsils, the thymus, the spleen, in Peyer's patches, the follicular glands of the tongue, etc., actively multiply and get into the lymph stream and pass on into the blood and become colorless corpuscles.

"Of the six per cent. of solids dissolved in the lymph more than one-half is proteid in nature. The salts are similar to the salts of the blood."

SALIVA

The saliva, reviewed briefly but not slightingly, is found to contain inorganic and organic substances. The inorganic substance contains carbonates, phosphates, chlorids, etc. Among the organic constituents we find coagulable proteids, among which is the very important ferment called ptyalin, the amylolytic or starch-splitting ferment, about which we shall have more to say later on.

We would like further to review the urine, the sweat, and other excretions and secretions, but time forbids, so we will make a recapitulation of our reviews with reference to the effect of heat on the various constituents according to previous tests recorded.

EFFECT OF HEAT, WITH REMARKS

Proteids: In our familiar example of proteid or albuminous substance, the white of egg, we find that the entire substance sets into a solid on boiling, but we find also that this proteid begins to coagulate at the low temperature of 125°F., and at the temperature of 150°F., at which temperature a great amount of our food from habit is ingested, a great portion of the albumin is set into a semi-solid consistency. In the yolk of the egg a similar change took place, but to a less degree, and the acid reaction seemed to be increased slightly.

The Animal Cell: (Amœba test) Moderate heat acts as a stimulant to the amœba, the movement of the organism stops when the temperature is lowered near the freezing point or raised above 104°F.; between these two points the movement increases in activity; the optimum temperature is about 98.6° F. to 100° F.

"Although cold stops the movement of protoplasm, exposure to a temperature even below 32° F. does not stop its reappearance if the temperature be raised; on the other hand, prolonged exposure to a temperature over 104° F. altogether kills the protoplasm and causes it to enter into a condition of coagulation or heat rigor. We have already seen that proteids, the most abundant constituent of protoplasm, are coagulated by heat."—(Kirk)

To what extent the vital multicellular organism would suffer in this respect is problematical, as there is a continuous process of building up and tearing down of tissue with removal of waste products through the process of nutrition and freshened blood supply; but we do know, however, that in the complex human organism a general temperature of 107° F. is regarded seriously and usually proves fatal to the prolongation of life of the organism. A few cases have been recorded in which temperature much higher than this has been tolerated for some time with subsequent recovery, but such cases are rare.

Dr. Thompson's work on Occupational Diseases published 1914, records as follows: "In 1906 a patient died in my service at the New York Hospital after sustaining for some time a tempearature of 117.8° F This temperature is incompatible with prolongation of life, as heat rigor of the muscles occurs at a slightly higher degree, (120° F.)".

This work which was referred to in order to determine the general effect of excessive heat endured by laborers employed in this class of occupation, in speaking of such employes, says: "These types of laborers are subject mainly to rheumatism, bronchitis and chronic nephritis, which appears to be due more to the sudden cooling off of the body which checks perspiration and affects the vasomotor system than to the heat itself." "Temporary exposure to dry air may be endured up to 150° F. or more. Hot, moist, still air checks evaporation from the skin, and taxes the cooling mechanism of the body. Blood goes to the relaxed vessels of the body surface to be cooled that should go to the brain and muscles, hence the physical and mental languor."

This theory would not seem to be entirely correct if our knowledge of proteid coagulation or heat rigor, which we have just reviewed, is also correct, and if a general temperature of 120° F. produces heat rigor of the muscles; nor does it harmonize with my theory that these pathological reactions, and those of pyorrhea alveolaris, are the result of the destructive influence induced in the blood and lymph and other tissue by the process of coagulation of the proteid, and chemical reduction of other constituent elements brought about by the application of excessive heat, either local or general as the case may be.

BLOOD AND LYMPH

The Plasma: The only record found relating to plasma states that fibrinogen is coagulated at the "low temperature of 132.8° F."

The beneficial effects brought about by the elimination of proteid diet in the treatment of rheumatism would seem to indicate that the peptone reversed to native albumin and globulin is the principal substance in the blood affected by the heat in this particular disease, and that it is through the destruction of such proteid substance in the plasma that the so-called "rheumatism" is produced. For example symptoms of "rheumatism" were produced in a non-rheumatic subject in the following manner: after ingestion of a meal composed almost entirely of proteid substance, during and for a short time following the period of digestion the hands were bathed frequently in water having a temperature of about 150° F. Upon going out into the cold air the skin, whose function includes the regulation of the body temperature, (and that fact alone would suggest a limitation to toleration of heat by the homoiothermal organism) and to a large extent the elimination of proteid waste material, ("albumin is found in the sweat in acute rheumatism") closing, in order to retain the necessary degree of heat, also retained the injured proteid substance, the poisonous effect, or "rheumatism" resulting, the symptoms in this particular case occurring upon the shoulder where the weight of the overcoat interfered with the free circulation of the blood.

The Red Corpuscles: The only thermal test of note in regard to the red corpuscles states that the effect of heat up to 120°–140°F. causes the formation of bud-like processes. However, we will have more to say about these corpuscles later on in our observations upon the disease, pyorrhea alveolaris.

The Colorless Corpuscles: No particular test could be found with regard to the effect of heat upon the colorless corpuscles. We are reminded that these corpuscles are "typical animal cells," and we have seen in the example of the amœba the effect of heat upon the "typical animal cell," of undifferentiated protoplasm. One record states that "nuclein, the chief constituent of the cell nucleus, contains a high percentage of phosphorus. Decomposed it yields an organic acid called nucleic acid and a variable amount of proteid." One illustration shows "an amœboid corpuscle of the newt killed by instantaneous application of steam" to show the appearance of the pseudopodia. "These cells may be fixed by a jet of steam allowed to play for a moment on the surface of the cover glass."

Further than that which has been previously recorded about these most interesting of blood elements, we casually quote the following gleaned from literature upon the subject, gout:

"Gout is a condition characterized by the presence of excess of urate of sodium in the blood; this salt is deposited in the cartilages of the joints, and also in bursæ and connective tissues, under certain circumstances which are not fully understood, the precipitation in the joints being accompanied by attacks of severe pain and by symptoms of inflammation.

"Uric acid, which is converted into sodiumurate by the salts in the blood, is supposed to be formed in two ways, (1) By the breaking down of the nucleo-albumins of the tissues and especially perhaps of those contained within the leucocytes, (2) From similar substances contained in the food. Excess of uric salts in the blood may be produced either by increased formation of these substances, or by diminished excretion of them, or by failure to utilize or destroy them in the metabolism of the tissues. Which process is at fault in gout is not known. The association of the disease with granular kidney might appear to point to defective excretion as a possible cause, but this association is not constant. Indulgence in alcohol and rich food is almost certainly a factor in many cases of gout. It is not impossible, on the other hand, that this disease is due to a defect of assimilation, dependent upon a perversion of the normal chemical action of the cells."

We could not presume to suggest upon this subject, but it would seem from the above evidence that little is really known about this disease, and that the theory of the effect of heat upon the colorless corpuscles has been obviously ignored. We wish to repeat with significance, however, the paragraph "By the breaking down of the nucleo-albumins of the tissues and especially perhaps of those contained within the leucocytes."

Lymph: We will take the time to mention only one lymph test as follows: "Lassar tied a canula into a large lymphatic of each hind leg of a dog. He then stopped the circulation in one leg, and dipped this into hot water (130° F.) thereby exciting acute inflammation. On removing the obstruction the lymph stream from the canula at once exceeded the normal, and soon reached eight times that on the sound side. At first the fluid was clear, but after a time increasing numbers of white corpuscles made it cloudy, and red corpuscles were found in small numbers. Later in the experiment the flow diminished, partly because exudation diminished as pressure on the vessels arose, and partly *from coagulation in*, and consequent blocking of, lymphatics. The lymph collected differed from the exudation fluid in passive hyperæmia in containing a much larger proportion of proteids, *and in having a greater tendency to coagulation.*"—(Green).

As the lymph problem is too extensive to he handled in a paper of this sort, to work out the probable effect its destruction in this manner would have in the diseases dropsy, nephritis, etc., we will pass this constituent without further comment and take up the problem of the secretion, saliva, which problem comes within our own province.

Saliva: The saliva, we have seen, contains organic and inorganic compounds. "On standing the saliva becomes cloudy, owing to the precipitation of $CaCO^3$, the CO^2 which held it in solution, escaping as bicarbonate."—(Kirk).

The CO^2 can also be driven off by heat, the lime-salts being precipitated. This is the simplest kind of chemical reaction.

The function of the saliva is two-fold, physical and chemical. We are not particularly interested in the physical function, for the food can be softened and moistened previous to entering the mouth and then washed down if occasion requires or desires, but what we want to remember is the chemical function of the ptyalin, the amylolytic or starch-splitting function, the function of the beginning of digestion of the carbohydrate food in the natural manner, at the proper time and in the proper medium.

"Ptyalin acts best at about the body temperature (95°–102° F.), and in neutral medium, a small amount of alkali makes little difference, but a very small amount of acid stops its action. Its action continues for from fifteen to thirty minutes only after it reaches the stomach, due to the neutralizing effect of the acid medium encountered there. It has no action on cellulose, and therefore has no action on uncooked starch grains unless the cellulose layer has been broken up by the process of cooking, or is broken up by the teeth during the mastication of food."

(Modern physiologists state that the action of the ptyalin continues for from thirty minutes to two hours and thirty minutes after reaching the stomach.)

The necessity of masticating this class of food is so clearly illustrated for us in the simplest possible natural manner in the ruminating species, and in the "rooney family," of the lower animals, if we will but confide in nature to the extent of studying her handiwork in a gross way before resorting to the implements of man in an effort to solve "problems" of minute detail, and which, after they are finally "solved," are more or less chimerical.

(The above paragraph refers particularly to the study of carbohydrate digestion in the carnivora, which is given so much space in all physiologies, when it is known that the ptyalin of man has carbohydrate digestive properties and it is known too, that the carnivora has no ptyalin ferment, the chemical function of the saliva being absolutely ignored.)

The ptyalin is entirely destroyed at a temperature of 150° F. This test was not run down to see at what low temperature the destruction began, because it was not desired to deprive other investigators who might become interested in the subject of that particular privilege. At this point of investigation too, it was decided as final that nature did not intend that any food be taken into the system at a temperature sufficient in extreme to produce symptoms of inflammation.

Diabetes-mellitus: We will continue our study, now turning to another disease of mystery, diabetes-mellitus.

Diabetes is a disease characterized by the continual passage of large quantities of urine containing sugar.

"As with the urates in gout, so with the sugar in diabetes, excess may be due either to increased production or to diminished excretion, or to defective utilization of substance in the chemical life of the cells.

"In true diabetes it has been suggested (1) that the liver is unable to retain the glycogen that is usually stored up in it, and which therefore passes rapidly into the blood.—(C. Bernard). (2) that some ferment normally contained in the blood by which sugar is destroyed, is absent in diabetes. (Lepine). (3) that some toxin is formed which interferes in some way with the production or utilization of sugar; (4) that carbohydrate food, which is usually absorbed from the intestine in the form of fat, is in diabetes absorbed as sugar, which passes into the blood stream and acts as a poison.—(Pavy).

"There is not at present sufficient data available to settle which, if any, of these views represents the true nature of the disease."

From the above we can see that little is definitely known about this disease; also everything is more or less suggestive in form; therefore the following suggestion of the probable cause of this disease is offered with a hope that it might be of worth in clearing up this problem.

Formula:

Dextrose	Water	Glycogen	Diabetic-sugar.
C_6-H_{12}-O_6	H_2O	C_6-H_{10}-O_5	C_6-H_{12}-O_6

It is not improbable that the disease diabetes is the result of one or more of the following possible causes; (1) indulgence in the habit of ingesting large quantities of sugar foods, candies, syrups, and the like. Such substances are not natural food, and nature has made no provision for neutralizing them when taken into the system in excessive quantities; (2) taking into the stomach carbohydrate food without thorough insalivation, and carbohydrate beverages, which it is impossible to insalivate; (3) ingestion of food at a degree of heat sufficient to cause absolute or even partial destruction of the ptyalin ferment.

In the natural process of digestion the carbohydrate food, through the process of mastication, is thoroughly insalivated and the ptyalin, beginning its work of digestion in the mouth, continues to change this class of food into sugars for some time after it has entered the stomach, where its action is finally arrested and the product neutralized by the acid secreted by that organ.

In both of the latter probable causes suggested, the carbohydrate food, receiving little or no digestive action from the ptyalin, passes through the stomach without receiving the counter-influence of the strong acid medium there, and is broken up into sugars by the pancreatic juice, this juice having insufficient or no neutralizing power to make up for the loss of that which nature has provided to accomplish this purpose in the stomach, allows the food to pass on into the intestines to become absorbed and taken into the blood in an improper condition.

That the carbohydrate food must first be prepared for destruction by the ptyalin would seem to be demonstrated in this disease, in the clinical observations, which show that the majority of this class of patients are known to indulge freely in the beer-drinking habit, and in another class, an example of which we will soon detail, in which this digestive ferment, and the early digestion of the stomach too, have been destroyed by the high temperature of the food ingested.

The disease in the former class of patients is thought to be caused by the resin contained in this beverage, but resin we find has not the formula of diabetic sugar, and while it might be possible to form the diabetic sugar from resin, it would hardly seem reasonable to suppose that such is the case when we have the diabetic sugar formula already complete in the sugars of the monosaccharide group, which are known to be constantly contained in variable percentages in this beverage.

This theory is not as indefinite and mysterious as those previously suggested, and if our knowledge of physiology and chemistry is true it would seem to be more logical.

TO SUMMARIZE

The effect of heat need not necessarily produce distinct symptoms, because all constituent tissue elements are more or less affected at the same time, but where there is a temperamental predominance, the symptoms seem to have distinction in accordance with the predominating element found in that particular temperament.

In the disease or reaction called rheumatism, where we have pointed to the destruction or reduction of the nutrient proteid constituent as the probable basal cause of the disease, the most severe cases should occur in persons of the sanguinary type, in which there is an abundance of the nutritive element. This does not necessarily exempt other temperamental types from such symptoms, because there is sufficient destructible proteid in the plasma and other constituent elements of the tissues of all types, basal or mixed, to produce the symptoms under favorable conditions.

In the disease called gout in which the destruction of the colorless corpuscles, including the reduction of their nuclei, has been pointed out as the probable cause, the most severe cases should occur in persons having a tendency toward the lymphatic type in which type these factors appear to be found in greater abundance.

In the diabetic person the quality of the ptyalin ferment, the character and amount of food, and the individual habits of ingestion should all have bearing upon the intensity of the symptoms. The general habits of the individual, however, must be given due consideration in a thorough study of any disease.

This brings us finally to the theme of our paper, leaving the effect of the destruction of the red corpuscles still to be accounted for, and this factor will be considered under our observations on the disease pyorrhea alveolaris, to which we will now direct our attention.

PYORRHEA ALVEOLARIS

It would be a waste of time to review the pathological or clinical symptoms of this disease, because these are unpleasantly familiar to all dental practitioners.

The various causes enumerated, the eldest the mysterious "rheumatism" of the teeth, then the salivary calculus, the serumnal calculus, the lack of contour with improper proximal contact in the natural tooth or in the restoration, inferior dental operations particularly in the finishing of cervical margins of fillings and in adapting the peripheral band in crown and bridge work, injury to the pericemental membrane in careless operations of orthodontia, etc.; then the germ theory has been applied from one extreme to the other. All these causes we have seen as factors in the greatest number of cases of pyorrhea alveolaris. We have seen pyorrhea alveolaris associated sometimes with a single one of these conditions, sometimes with all of them, and sometimes without any one of these factors being present, even to that of pus, although this is contrary to correct nomenclature.

(The latter statement we now believe to be incorrect. The caseous matter which we find encircling the roots of teeth in the latter stages of this disease we now believe to be the result of disintegration of the pus corpuscles.)

The so-called "rheumatism" of the teeth, or the association of the disease rheumatism with that of pyorrhea alveolaris, never has been satisfactorily cleared up, and the "serumnal calculus" too, always has been more or less of a mystery.

The destruction of the red corpuscles and the serumnal calculus never has been associated, in spite of our records stating that the red corpuscles are the elementary constituents of the blood that contain the coloring matter, and that they *crystallize under certain destructive conditions*, producing a product varying in color from the reddish brown to a light gray, which tallies nicely with the hue of the so-called serumnal calculus.

The fact, too, that our most severe cases of pyorrhea alveolaris are found among patients having the bilious temperamental basis, in which temperament the red corpuscles are supposed to predominate, would seem to associate the destruction of these constituent elements as important factors in the cause of this disease.

TWO FACTORS IGNORED

Two factors that I have associated with this disease, of which I have been unable to find record are, (1) that of the effect of ingesting excessively hot food, the heat being carried directly to the pericemental membrane through the conductivity of the tooth itself, and the products of the injured circulating elements being carried to the point of irritation by the blood stream, producing destructive influence upon the pericementum indirectly.

This factor has been associated with this disease invariably, in cases that have come to my notice since observations along this line began, (2) a temporarily depraved condition of the blood producing exaggerated symptoms, brought about seemingly through lack of sense of, or disregard for our health law No. 4.

This latter condition was observed in persons whose habits were known to be below the average moral standard, and in others whom circumstances classified as suspicious.

There is nothing that depletes the nutrient fluid so much as this unnatural waste of physical strength. This fact is recorded in our literature, and since dentistry is not an hypocritical profession, but is of humane purpose, there is no reason why we should not dispense such knowledge with our professional advice when we see it is indicated as a necessity in our therapeutics of this disease.

OBSERVATIONS

In ingestion of liquid nutriment at an unpleasantly high temperature it was observed that, as response, acute inflammation occurred along the lingual gingivæ of the upper incisors. At this particular location many cases of pyorrhea had been observed; and it was observed, also, that the older theories did not fit these cases. There was no salivary or serumnal calculus, or other traces of local irritation; so the hot liquid was accused. Then it was observed in ingesting the hot food, that when it was uncomfortable to the tongue it was shifted from one side of the mouth to the other, striking the lingual gingivæ of the upper first molar most frequently. At this location recession had often been observed and at this location, too, the older theories did not seem to apply satisfactorily; so the heat theory was again accused. Tearing the hot food off the fork in the region of the bicuspids produced results that seemed to tally with these accusations, and the frequency of the occurrence of the symptoms upon the lower incisors was attributed to the misapplied function of incising hot food.

After these observations had been going on for some time it was decided that pyorrhea alveolaris was the result of low-grade inflammation caused by the tooth conveying the heat to the unresponsive pericemental membrane, producing the destruction of that naturally weak tissue.

Destruction in some cases seemed to be apparently a variety of fatty degeneration with its caseous termination, sometimes liquified, sometimes only partly so, and sometimes without anything being present that resembled pus in any form. In the more familiar cases, however, the destruction seemed to be of a thrombosis nature, with rupture of the blood vessels resulting in migration of the corpuscles, etc., the red corpuscles breaking up and crystallizing, and the colorless corpuscles taking up their usual function as phagocytes with their customary vigilance striving to eliminate the injury.

As the red corpuscles contain elements which when reduced are capable of forming mineral salts, and as the mineral salts are all good dialyzers, it is quite probable that the so-called serumnal calculus is formed in this manner, as suggested previously.

REPORTING A FEW CASES

Case No. 1. Patient just past middle age, woman, bilio-nervous type, health poor, who upon my advice and the co-advice of her physician had had all of the teeth removed from the upper arch, and all except a few that were comparatively free from the affliction of pyorrhea and which were retained to assist in her future struggle with mastication, from the lower arch. Dentures were inserted immediately. During her endeavors to master their use with the alveolar process changing, while in the office one day asked the old question that we have been asked over and over again: "Doctor, what is the cause of pyorrhea?" After going over the usual list of supposed causes the reply was finished with the remark that it was my belief that it was the ingestion of hot drinks and hot food that was doing the mischief. The expression of mingled revelation, terror and despair that instantly appeared in the eyes of that unfortunate patient was convincing as she quickly replied, "Why, ever since I was a little girl I have been drinking my tea so hot that it would burn all the way down. I never could enjoy it unless it was almost boiling."

This was encouraging to my theory, as was the history and text of the next pyorrhea victim questioned, and as all have been since observations began.

Case No. 2. Woman, probably fifty-five years of age, bilious temperament with traces of the sanguine and lymphatic, excellent health, active business woman, enjoys athletics, especially bowling, which is her favorite pastime.

Teeth loosening and many have been removed after having become hopelessly loose and useless. There is suppuration around some of them but some have no trace of pus. Upon removal of the latter, what seemed to be a caseous material was found to encircle the root just external to the line of attachment. There was no trace of salivary or serumnal calculus.

In reply to my inquiry pertaining to habits of food ingestion her answer was similar to that of Case No. 1. She could not enjoy her coffee unless it was almost boiling.

The following thermal test was obtained:

Wheat	145°F.
Beef	150°F.
Vegetables	140°–145°F.
Beverage	140°–145°F.

This test was taken at a time when the mouth was sensitive from "cold" and the food was admittedly not as hot as it was customarily ingested.

Case No. 3. Man, age about forty-five years, sanguo-lymphatic temperament, active business man whose occupation permits him to be out of doors a great deal of the time, enjoys athletics, is member of gymnasium, excellent health.

Teeth were encircled with a layer of salivary calculus, the alveolar process around a majority of them having receded probably half the length of the root, There was no suppuration, the calculus apparently arresting the heat.

Response to the usual inquiry was that he did not take his food at a high temperature. The following thermal test seems to contradict his statement, but through the characteristic lack of sensation of the mucous membrane he could not realize this.

Meat	138°F.
Vegetables (3)	154°F.
Coffee	138°F.

There was effort toward prophylaxis, too, in evidence, and the results were probably as good as could be expected from one without special training.

Case No. 4. Embraces a family of seven persons, all of sanguo-nervous temperament. The father an active business man, age sixty, enjoys a great deal of outdoor exercise, is subject to attacks of insolation, nephritis, and heart trouble. The mouth was not examined, but few teeth are remaining, and some are known to have been extracted by "digital forceps."

The following thermal test was taken as the food was being ingested (as all were requested to be taken) and is known to be absolutely correct:

Soup	163°F.
Meat	160°F.
Pudding	140°F.
Coffee	164°F.

This test speaks the custom that is common to the entire family.

The mother, who has accepted no opportunity of taking outdoor exercise, has been a victim of "rheumatism" for many years, and for the last year or two has been taking medical treatment for diabetes. The diet for rheumatism eliminated the proteid nutriment, and the diet for diabetes eliminates the carbohydrate food, which leaves little for choice with which to work out the metabolic equation.

Artificial dentures have been worn by this patient for many years, the clinical appearance indicating loss of the natural organs through the process of pyorrhea alveolaris or from excessive deposition of salivary calculus.

Candy has always been obtained in frequent and large quantities by this family, the mother usually acting as chief purchaser and liberal consumer of this delicious food.(?)

The diabetes theory therefore, ingestion of quantities of the unnatural sugary food candy, imperfect mastication of food, and destruction of the ptyalin ferment, applies to the full extent in this case. This patient is not a beer drinker.

This woman has a magnificent constitution, (otherwise she would have been in her grave, in all probability, years ago) and there is no reason why she should not be in perfect health today at the age of fifty-four years, if she had lived along natural lines.

Three of the five children have "inherited rheumatism." The eldest a victim of this inheritance, having changed her environment and mode of food ingestion, avoiding the application of excessive heat in any manner, is practically free from rheumatism at the present time. However, there does seem to be an inherent low destructive quality of blood, for by applying hot water to the hands momentarily, or by drinking a cup of hot beverage, when the weather conditions are favorable, the symptoms are aroused to their most violent form.

It might be well to mention another point of interest in connection with this family, (a point that is quite noticeable in so many families afflicted with white decay of the teeth). The younger generation have all been trained in the art of "oral prophylaxis" and all handle the tooth brush and dental floss in an equally efficient manner; despite this fact however, those who remain in the candy environment are continually requiring professional service, while the one who has changed environment and has eliminated the candy habit, has required no dental attention worthy of mention since the habit was discontinued, or during a period of six or seven years.

Many cases were tested bearing out the theory of heat destruction, but these four cases include sufficient variety to warrant thorough investigation into this subject, of boundless pathological possibilities.

(Mentioning by way of emphasis, a few familiar examples; such as cancer of the lip from the hot pipe stem, and of the throat from continuous smoking of the cigar; ulcers, etc., of the stomach, from hot food; noting the great resemblance of the diseases "coagulation necrosis"—usually the consequence of a burn—and diphtheria. Also a personal experience of heart disorder manifested by continual pain around the apex of that organ, developed after going into a building having running hot water, the hands being washed many times during the day in this water having a temperature of about 150°F., also an accompanying kidney disorder, both of which have disappeared since the use of hot water and hot food have been discontinued.)

SOLUTION

The solution is largely a problem of education. It is not possible for people whose habits of ingesting hot food excite acute inflammation of the first foot and a half of the alimentary canal two or three times a day, or by other careless or ignorant habits produce similar effects, either local or general, to enjoy perfect health.

It should be found out definitely at what low temperature the tissue can be injured by heat so a reasonably safe basis can be established.

Lassar says a temperature of 130°F. is unsafe, according to Thompson a temperature of 120°F. is destructive, Instinct says a temperature of between 110°F. and 115°F. is about the proper degree of safety.

It must not be foolishly advised to eat uncooked food, unless such food has its natural protecting cover intact or is known positively to be fresh, but the cooked food should be allowed to cool to a proper temperature before being eaten.

TREATMENT

In the treatment of rheumatism, gout and diabetes, in addition to the remedies that give relief in their mysterious way, the rational process would seem to be to produce diuresis and diaphoresis in a way that would not cause further tissue destruction, and with diabetes it would seem to be further desirable to eliminate from the diet unnatural sugary food, and to produce thorough ptyalinization of all carbohydrate food, restricting carbohydrate beverages which can not be insalivated.

The ptyalin ferment and the secretion of the stomach should be regulated, or substitutes administered with a view to extract, at the proper time, the molecule of H_2O, that seems to be present as surplus over that of the natural sugar glycogen, in the dextrose found in the urine of these patients.

If the Cl. of the HCl of the stomach is really obtained from the NaCl of the tissues, as some physiologists seem to think, then it would seem to be advisable to eliminate salt (NaCl) from the diet, on the theory that the taking of food into the stomach in an hypotonic state would create more energy than would the hypertonic diet.

In pyorrhea little can be suggested over the treatment that is customary today. If the disease can not be controlled by the usual removal of the irritating elements, coagulation, protection of the pericemental membrane, outdoor exercise, etc., then the proper thing to do is to assist nature in her process of exfoliation of the irritant.

While the disease is being treated the patient should be advised to massage and scrub the gums thoroughly before meals as well as subsequently, in order that the suppurative products may not be incorporated with the food and carried into the digestive tract. This is an important item that is not commonly included in our advice to this class of patients.

CONCLUSION

In conclusion, the attention is again called to the scarcity of literature upon the subject of the destructive effects of heat upon the vital organized tissue, and that in this paper little has been considered except the coagulative effect upon the proteid constituent.

We would like further to remark for the benefit of those who are fearful that evolution will in time produce a normal human being without organs for masticating food, that it has not been observed that any animal of the "back-bone" type subsisting on herbivorous or omnivorous diet, from the day of the dinosauria down to the present time, has appeared naturally without the accompaniment of teeth with which to masticate carbohydrate food, and it is not probable that any such radical change will take place in the natural course of events sufficiently soon to cause the present generation any discomfort.

It is all right for people to preach this doctrine of evolution, of course, provided they can not find more material things with which to occupy their time, and provided also that they do not care if other people might come to realize how little they know about the nature of carbohydrate digestion.

It is well for us to be able to apply our science in the treatment of pathological conditions, provided such application does not interfere with the natural process of things; but since we must depend upon nature for ultimate consequences in our treatment of all diseased conditions, it would seem that a science, in order to be best of all, must be founded upon a natural basis, recognizing primarily that in so far as the regulation of human health is concerned, nature alone is supreme.

39 W. McMillan St.

A QUICK METHOD OF MAKING SHELL CROWN*

BY L. E. TRINKLE, TERRE HAUTE, IND.

Prepare tooth for crown, leaving any cusps until occlusal surface of crown is made.

Make band and having the alignment, trim according to bite on opposing tooth, leaving the points to form cusps.

Contour.

With band on tooth secure contact with adjoining teeth.

Roll a piece of pure gold as thin as it can be rolled.

Anneal.

With a pair of sheep nose pliers, a plate tooth or die, shape the pure gold into cusps.

Burnish to band.

Solder on palatal surface with small piece of solder.

Fit on tooth.

Bite.

Remove.

Burnish the band and file for a perfect joint.

Solder heavily.

Place small piece of plate gold in center to reinforce.

Be sure to grind tooth enough to let crown to place

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*Clinic Indiana State Dental Society, 1916

DEAN HOFF RESIGNS—WARD SUCCEEDS

Michigan Dental College to be Largest in the World

ANN ARBOR, Mich., July 19.—At the regular monthly meeting of the board of regents of the University of Michigan held today, the resignation of Dr. Nelville S. Hoff, since 1911 dean of the dental college of the university, was tendered and accepted. Dr. Hoff has been a member of the faculty of the dental college since 1887. His resignation was occasioned by the continued ill health of his wife. Dr. Marcus L. Ward, a member of the faculty of the college since 1903, was appointed dean in his place. Dean Hoff's last request, that 13 new dental chairs be added to the operating room of the college, was granted. This makes the Michigan dental college the largest in the world.

RESTORATIONS BY THE AMALGAM MODEL METHOD*

BY RALPH MILLER, TOLEDO.

THIS CLINIC deals with inlays only, all cases shown being "practical" ones. The results obtained by this method "approach" a perfect restoration; the greatest objection is the color.

The impression of the cavity is the first and most important step in the process. All outlines must be sharp and definite. Confining trays according to the plan of Dr. Van Woert are used. Kerr's stick impression compound is heated, made cone-shaped, cooled—then just the tip is reheated and quickly forced into the cavity and chilled under pressure. Reheating the impression by means of the hot-air syringe and forcing back into position is often necessary to obtain the desired results. When the impression can be removed without dragging or being distorted and all of the margins are good, take the "bite." For this S. S. White Tenax Base Plate wax is the best. When cool it is firmer than the ordinary wax but not brittle like modeling compound. It is important to have the patient bite "natural" and hard, and to chill the wax before the pressure is released.

Now, invest the impression in plaster to make a convenient form for packing the amalgam. Use a very small, round burnisher to start the amalgam, having the first portion of it "sloppy" i.e., an excess of mercury. With this burnisher push small portions of this soft mix into every minute crevice of the impression, then use a stiffer mix to fill in, pound and squeeze out the excess of mercury until the model is quite hard. Put in press over night.

Then put into fairly hot water for a few minutes, break plaster with hammer, and separate compound from model. Trim the model with heatless stones (soapstone and carborundum) to the approximate shape of the tooth. Cut grooves + shape in base with separating disks. Seat into wax and mount bite on small articulator. When plaster is set, separate.

Oil cavity and margins with equal parts sweet oil and glycerin, soften Taggart's inlay wax (dry heat) and force into cavity. Carve into the shape of the lost tooth structure as nearly as possible, using straight spoons and Ward's wax-carver. Be sure to have the wax flush with all margins, and have a strong contact. This carving of the wax is not easy to do and takes time, for every case is different, every tooth is worn differently all—sulci, pits and marginal ridges are not the same. If you are going to restore occlusion, restore it.

Having the wax carved, insert the sprue-wire, invest, dry out and cast. (On account of using centrifugal force in casting we use a double investment—

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*Clinic Ohio State Dental Society, December, 1915.

Kerr's inlay investment with Brophy's Imperial for the bulk. We also alloy the gold with 1 to 5% platinum according to the stress placed upon the inlay.) Finally, and very important, seat the inlay into the amalgam model by means of a simple crown swaging device. This relieves the tooth of much strain and overcomes any distortion of gold inlay in cooling. Now, finish the inlay in the model—another advantage—and it is ready to be set.

Many of the minute details of this clinic can not be given in a short, concise description.

THE ERADICATION OF PYORRHEA BY PROPHYLACTIC MEASURES*

BY GEORGE S. HERSHEY, D.D.S., COLUMBUS, O.

IT IS AN HONOR, I assure you, to be invited to give a paper before the Central Ohio Dental Society, the pick of the Buckeye's Best, and a pleasure to put before you a few statements on the threadbare, much berated old disease, Pyorrhea.

I stick to the name pyorrhea because it is the name the profession and the laity have been educated up to calling this pathological condition of the gums. Why spend hours of time and pages of space in our dental journals discussing the word *pyorrhea;* and why change it, when it has taken years and years to educate the public up to its present knowledge of this disease, which is known to them as Pyorrhea?

Why not recognize this disease by stages, calling it the first, second and third stages of pyorrhea? The first stage—when you have the deposit with a slight or possibly not noticeable irritation. Second stage—marked recession and ragged appearance of gums, with or without pus. And third stage—loose teeth with broken down tissue, which is invariably accompanied by pus. The first stage, if neglected will run into the second, and the second into the third, with final loss of the teeth.

I think this classification should be adopted by the profession, because it seems to be a great temptation for dentists to consider a slight irritation of the gums as of not much consequence, and of course lead their patients so to believe also. This first stage of pyorrhea should have just as much care as the well-developed case in order to prevent that which otherwise is sure to follow.

But why waste time preventing pyorrhea when we have a specific for this disease? With forty pills of ipecac, and a few drops of emitin injected into the pockets, so the manufacturers tell us, the pus will disappear, the gums and teeth will become firm, and the patient will be happy forever. I even have heard a dentist declare before his society that with two days' treatment of ipecac he had seen a bad case, the third stage kind, practically cured, the pus absolutely gone, the gums and teeth firm, and this accomplished without any effort being made to scale the roots, nothing more being done than the ordinary dollar cleaning.

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*Read before the Central Ohio Dental Society, 1915.

How I wish I could have a dream like this! This dollar cleaning reminds me of a patient's remark made some time ago He is a traveling man, fifty-five years of age, and in his travels has had his teeth cleaned by a number of different dentists. His teeth were well up in the third stage of pyorrhea, and I had just spent *one hour* scaling the upper right third and distal half of the second molar, when, with a thoughtful expression, he looked out of the window at the squirrels playing in the State House yard, and said: "It would have paid me better to have thrown the money I have spent for having my teeth cleaned to those squirrels. It would have saved my time."

This careless cleaning of teeth is a crime, and a crime for which the public is suffering, and it will not be many years until the dental profession as a whole will suffer. Right here I would like to quote Dr. M. S. Schamberg, head of Oral Surgery Department of the Post Graduate Hospital and School of Medicine, of New York City: "I have noticed, in the study of hundreds of cases in our wards, that the patients who seek charity at our hands give evidence in their mouths of having spent considerable money for the type of dental work that is common in the dental parlors and among unscrupulous dentists, who are putting gold crowns and bridges in mouths without regard to the damage that such work produces. In view of our present knowledge of the damage of such practices, it *should be considered a crime* to put a gold crown or bridge upon a tooth, unless that tooth is properly prepared to receive it."

I would like to add to this by saying that the dentist who permits a patient to go from his office with an uncleanly mouth, or a deposit under the free margin of the gums, no matter how slight, without a thorough prophylactic treatment, or advising him of the existing condition and what it will lead to, is as guilty of a crime as the man who abuts a bridge on a tooth or root that has not been properly treated and filled—more so in my opinion. The infection caused by the improperly filled root is as a rule confined to that root, while with the uncleanly mouth, with deposits, the infection may extend to a possible thirty-two teeth.

Now, Mr. Dentist! dig down deep into your own conscience and ask yourself if it is not a crime, and a serious one, to allow a patient who has in you all the confidence in the world, to come to your office year after year with this deposit left on his teeth, until at last his mouth is reeking with pus, and you advise him as a last resort to have them all extracted and plates made, as there is no cure for this disease?

You would be surprised, as I have been, to hear of men supposed to be high up in the profession, and holding the confidence of the people, declare that there is no positive and permanent relief for pyorrhea. I have heard the point made that in pyorrhea the gum tissue is gone and no amount of treating can restore that lost tissue. We will grant that tissue cannot be restored if the process has been eaten away, but we do affirm that nature will restore the remaining tissue to a firm and healthy condition if we remove the cause of the irritation.

The causes of pyorrhea are faulty dental work, mal-occlusion, deposits. All over-hanging fillings must be made smooth if possible, and if they can not they must be removed and perfect restorations be made in place of them, preferably gold inlays.

I would like to ask while we are on the subject of fillings: Has any one in this meeting ever seen a clean healthy mouth in which the teeth, to any extent, have been filled with amalgam, after four years from date of filling? and I mean by this to include fillings which extend to and under the free margin of the gums.

It seems impossible to insert an amalgam filling that will not pull away from the margin of the cavity and cause a leakage, which in time causes the tooth to turn dark, and all the time harboring soft deposit and bacteria, with subsequent irritation of the tissue.

The hypersensitiveness of the teeth, caused by amalgam fillings in so many cases, is no doubt the primary cause of nervous stomach trouble, and nervous diseases peculiar to different individuals. That the elimination of the amalgam filling is considered very important by the most prominent stomach specialists is evidenced by the fact that they will not take a case where this condition exists.

A case in practice: A young lady twenty-four years old presented herself to one of the most prominent stomach specialists in Chicago for treatment. After an examination, he advised her that he would not take the case until she had the amalgam fillings removed from her teeth.

If the amalgam filling is the cause of any pathological condition, either local or general, and I assert that it is, it should be banished from the practice of dentistry. It may have its place in very rare cases, but these cases are rare indeed, and the preference should be given to the copper instead of the silver amalgam. Along with the amalgam filling must go the shell gold crown as it is made today.

I know probably what most of you are thinking at this minute, and it is that people will not pay for this better class of work. Now ask yourself the question: "Have I taken the time to advise my patients of the truth about dentistry, and what the results will be if their work is not done properly?" You probably have not taken this time or you would agree with me that there is not one patient in twenty-five who will not have the proper kind of work done if it is put up to him by a man who is a man, and believes and knows what he tells him is the truth, and is willing to back up this truth with the kind of work that will convince the patient in the many years to come that the money spent with his dentist was the best investment he ever made. If this one man in twenty-five will not spend the required amount of money to have his work properly done, let the other man do it. You cannot afford to do it and be honest with yourself.

Let me tell you right here, that a man who does dentistry in the right way for a few years need not bother about the "one man of twenty-five." The patients he will get will be those that go to him because they want good dentistry, and they know he is the man who will give it to them.

Here allow me to quote Dr. Ottolengui: "When bridgework first came into vogue, the advertising dentist did good service to his fellow practitioners when he advertised loudly that he could furnish 'artificial teeth without plates'. Quite often his product was no better, if as good, as the teeth supplied by his neighbor on a plate, but he collected more for his service. Why? Because he made his patient believe that what he supplied was worth more. Therefore the patient paid more. In like manner patients have been made to pay more for a shell gold crown than the same dentist could have collected for a gold filling in the same tooth, when if the truth were known the gold filling would have served the patient better. If, then, the charlatan and the quack can collect more for less valuable service, simply by informing his patient that the service rendered is valuable, why may not the ethical man similarly collect a better fee for a better service? There is no doubt that he can, if he but go about the matter in an honest and intelligent manner."

Patients often ask me why their dentist allowed their mouth to get into an unhealthy condition. I can answer this question to you dentists much better than I can to patients. To patients I necessarily must say that prophylaxis is comparatively new in dentistry, and that it has not been given the attention in the past that it will get in the future. When a patient presents himself with this condition, the dentist often cleans the teeth, which takes him fifteen or twenty minutes, and this service is probably given free with fillings or other dental work. Of course there should be no charge made for this kind of cleaning, as it is worth nothing. Nevertheless it is done, and the dentist prescribes his favorite mouthwash or ipecac, with the suggestion that the patient call every few days and have the gums sprayed. There is no virtue in the mouthwash or spray. The only benefit derived is from the cleaning, and unless this is done thoroughly and followed up at regular intervals it is as useless as the spray or mouthwash.

When a dentist treats the patient and tells him to come again in about a month, that puts it up to the patient and relieves the dentist of any responsibility. About one person of seventy-five will return at the end of a month, unless his teeth are uncomfortable, and there is only one way to overcome this, as I can see it, and that is to have a follow-up system and notify each patient when he is due for a prophylactic treatment. The importance of these treatments must be impressed upon the patient's mind before treatment is begun, he to agree to keep these appointments before his case is taken.

It is just as essential to keep the teeth and mouth clean as it is the body, and who of us in Ohio would think of taking one or two baths a year?

A few might be able to do this and be healthy, but the Board of Health would not tolerate it, and I believe it will not be many years before the Board of Health will not permit an uncleanly mouth, with the accompanying foul breath and the pathological conditions which follow.

Before closing, allow me to sight a few cases in practice to show how important it is that this work be done thoroughly:

Mr. T——, aged thirty-eight, had been given so-called prophylactic treatments once a month for several years. This man came to me with pockets between all the molars, and a pyorrheal abscess between the lower right cuspid and lateral. The night before his visit to my office this abscess had been very painful, causing much loss of sleep. If it had not been for this painful abscess, this case might have run into the third stage of pyorrhea, without him having the least knowledge of it. After three surgical treatments and several prophylactic treatments this mouth presented a normal healthy condition.

Mrs. R——, aged forty-seven, anemic, been treated for three years by prominent dentist, and pronounced cured three weeks before her husband, who is a physician, brought her to me. She had been on the ipecac treatment in conjunction with the surgery. A microscopical examination was made of the pus and all the usual bacteria were found, including a great number of very lively endamœba. Radiographs were taken of the devitalized teeth and the very loose teeth. The tissue surrounding the apical ends of the devitalized teeth was found to be normal, and the radiograph showed enough bone tissue remaining about the very loose teeth to warrant treating. The surgical work was thoroughly done, the loose teeth ligated, and as far as we could determine, without the microscope, the pus disappeared after the first treatment. Normal circulation was restored by subsequent treatments, and today, two months after the first treatment, this lady enjoys a healthy mouth with firm teeth and gums. She has gained in weight five pounds, which is very encouraging considering that before treatments were begun she was steadily losing. Her color, now, is about normal.

Mr. M——, aged forty-eight, had made an appointment with his dentist to have all of his teeth extracted. A friend insisted that he have further advice, and referred him to me. I found this case to be in the third stage of pyorrhea. Blood pressure before treatment—175. At the end of five months, blood pressure was 135. This patient remarked during his last prophylactic treatment that he considered that these treatments had added fifteen years to his life.

It is a pleasure, gentlemen, to get these results, and it is well worth the effort put forth to accomplish them.

In closing, we will sum up in a few short phrases what is absolutely necessary to eradicate pyorrhea by prophylactic means:

First: The Standard of Dentistry in our Colleges *must be raised.*

Second: The public must be educated up to the importance of oral prophylaxis, and the place to begin this teaching is in the primary grades of the public schools.

Third: The amalgam filling must be discarded and replaced with a material that will not change form, or check off on the marginal edges when worn thin.

Fourth: The shell gold crown must be abandoned, and in its place a crown that will not have a line of irritation under the free margin of the gum.

Fifth: The interproximal spaces must be preserved in bridgework. The abutting of the dummy against the supporting tooth is not permissible.

Sixth: The occlusion must be corrected. All undue stress upon one or more teeth must be relieved.

When the above suggestions have been followed, and prophylactic treatments given when necessary, pyorrhea will become a thing of the past.

Hartman Bld'g.

THE DENTISTS' MUTUAL PROTECTIVE ALLIANCE IN OHIO

BY GUY B. WEBSTER, CHICAGO

ON MARCH 27, 1916, The Dentists' Mutual Protective Alliance began its active campaign for membership in Ohio. On June 1st, the number enrolled from Ohio was approximately five hundred.

Surprising as this growth appears, it is only in line with the interest and enthusiasm with which the movement fostered by the Alliance has met in every state to which membership has thus far been extended.

Those Ohio dentists who are sponsoring the cause of the Alliance look for great things from the profession in their state. Their slogan is, "One Thousand Members in Ohio!" and all indications point to an early fulfillment of the ambition.

The City Dental Societies of both Toledo and Cleveland passed strong endorsements of the purpose and work of The Dentists' Mutual Protective Alliance, and the Cleveland Society likewise appointed a committee of three representative dentists (Drs. Geo. H. Wilson, S. F. Hirsch, and T. J. Hill) to assist the Alliance representatives in securing membership in that city. More than one hundred Cleveland dentists have enrolled in the organization since the passing of the above mentioned Resolution, on May 1st, 1916. Included in this group are such men as Dr. Weston A. Price, Dr. F. M. Casto, vice-president of the Ohio State Dental Society, Dr. Edward E. Belford, Dean of Western Reserve University, all of the officers of the Cleveland City Society whose terms expired with the May 1st meeting, and all of the officers elected at that meeting.

A similar endorsement was unanimously passed at the recent Youngstown meeting, in which territory there is now a large and enthusiastic group of "Alliance boosters."

Cincinnati has come in with seventy-one members, among which are all of the officers of the City Dental Society.

Columbus has contributed a membership of forty-two to swell the Ohio total. Akron, Canton, Lima, Lorain, Dayton, Hamilton, Elyria, Springfield, Portsmouth, Zanesville, Chillicothe, Gallipolis—all are well represented on the Alliance membership lists.

The seal of approval was set upon the endorsements of the various local societies by the action of the Northern Ohio Dental Association, which, on June 1st, passed the following resolution:

> RESOLVED, That we, the members of the Northern Ohio Dental Association, go on record as upholding the principle that it is unprofessional to exact or accept remuneration for a license to use the process disclosed in any patent of value in the relief of human suffering.
>
> WHEREAS, The Dentists' Mutual Protective Alliance is an organization whose purpose is to protect its members against process patents and to eliminate the same from the profession;
>
> BE IT FURTHER RESOLVED, That The Northern Ohio Dental Association endorses the work of the Alliance and that the president appoint ten men to assist in securing membership in Northern Ohio.
>
> ADOPTED: At the annual meeting of The Northern Ohio Dental Association, June 1st, 1916.
>
> (Signed) Clarence D. Peck, *Secretary.*

The committee referred to is made up as follows:

J. W. McDill, Cleveland.
E. S. Pettibone, Cleveland
W. D. Gans, Cleveland.
C. H. Clark, Youngstown.
C. S. Mygatt, Ashtabula.
J. C. McConkey, Canton.
J. E. Betteridge, Elyria.
A. E. Mann, Findlay.
A. F. Linscott, Marion.
J. H. Billmeyer, Norwalk.

The revised By-laws of the Alliance, which went into effect May 25th, provide for a governing body to be made up of two Governors from each State, in which the Alliance membership has reached a specified number. The first meeting of the Board of governors, so formed, will be held at Louisville, Kentucky, at the time of the National Dental Association meeting, in July. The Ohio governors, who will be in attendance at this meeting, are Dr. George H. Wilson, of Cleveland, and Dr. Edward C. Nills, of Columbus.

Northern Indiana Dental Society

The Northern Indiana Dental Society will hold its Twenty-eighth Annual Meeting in Kokomo, Indiana, October 12, 13, 1916.

The meeting bids fair to be the largest meeting ever held in northern Indiana.

The papers to be presented are of vital interest to every dentist of the State, and are subjects never before presented to a dental society in the state. Many good clinics are also booked for the meeting.

Respectfully,
Chas. A. Priest, *Secretary.*

EDITORIAL

A COOPERATIVE HELP BUREAU

At the recent meeting of the Indiana State Dental Association a resolution, offered by Dr. A. R. Ross, was adopted establishing what they term a Co-operative Help Bureau for the benefit of members of the society.

The Bureau is to be managed through the office of the secretary of the State Dental Association and its object is to supply help for members who are in need of it.

For instance if a dentist through accident, sickness or other cause becomes unable to carry on his practice, the Bureau will supply, from its list of eligible men, a licensed dentist to keep the office open and carry on the practice until the owner is again able to resume it. These available men will comprise mainly college graduates who have been licensed but who have not yet located for themselves. If any member is in need of a licensed assistant, the Bureau will supply such a man.

The Bureau will also assist recently licensed dentists who have joined the association, in locating in communities which are not already over-crowded.

The Bureau will also assist in the disposal of a deceased member's equipment to some recent dental graduate who is in search of an equipment.

The secretary of the association will keep a list of licensed dentists, members of the association who are available as substitutes, assistants, or purchasers of office equipment, and this list will be maintained as accurate as possible. Deans of dental colleges and the Dental Supply Houses will assist in getting up this list and keeping it accurate.

The members of the State Dental Association, according to the resolution, shall assist the secretary by notifying him of the sickness, death, retirement or removal of any dentist in their respective localities, and they shall further assist in making an inventory and cooperating in the disposal of a deceased member's office equipment.

The service rendered by the Bureau and members of the society will be free, and limited to members of the association.

It was further "resolved that this association, through its secretary or other members involved, will not assume any responsibility for the character or professional ability of dentists furnished through this service, though care will be taken to protect, as far as possible, the interests of all parties concerned."

It will be interesting to watch the outcome of this undertaking, for it seems to be a worthy one. Because of it more of the recent graduates should join the State Dental Association and become interested in society work; it will be of great aid to members of the association in securing any help that they may need, and assisting recent graduates to find favorable locations will be a service that should be greatly appreciated.

LAFAYETTE L. BARBER, D.D.S.

ELECTED PRESIDENT NATIONAL DENTAL ASSOCIATION
AT LOUISVILLE, 1916

Was graduated University of Michigan, 1885. Has held office of President in Toledo, Northern Ohio and State Societies, and has been a constant and energetic organization worker for many years

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVI SEPTEMBER, 1916 No. 9

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The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. BETHEL, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

THE SEQUELAE OF ORAL FOCI OF INFECTION*

BY CARL D. LUCAS, D.D.S., INDIANAPOLIS, IND.

CLINICAL EVIDENCE confirmed by radiographic examinations show how close is the relationship between the pathology of the mouth and that of the body as a whole. We now recognize that many of the chronic infections, such as arthritis in the various forms, including arthritis deformans, synovitis and muscular rheumatism, myocarditis, endocarditis, iritis and nephritis, may be the result of an infection the portal of entry for which is in the mouth In addition to these easily recognized diseases, patients with symptoms such as vertigo, dyspnoæ, palpitation of the heart, high blood pressure, neuritis, insomnia, albuminuria, all probably due to one of the above-mentioned diseases, improve after the proper treatment for demonstrable mouth lesions.

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*Read before the Youngstown, Ohio Dental Society, 1916.

Until the advent of the radiograph in the diagnosis of oral foci of infection these infected sufferers were treated only in a palliative manner, because the internist, even by his most conscientious efforts, was unable to locate the etiological factors of these chronic or sub-acute infections.

At the present time his routine in treatment of these conditions may first be palliative or eliminative, which is merely a temporary arrest of the sub-acute condition, followed by or concomitant with a careful examination of tonsils, ethmoid, frontal, maxillary and sphenoid sinuses, and a radiographic examination of all teeth and their supporting alveolar process.

It is a safe assumption to make that seventy-five per cent. of all so-called autotoxic sequelæ are traceable to infected sinuses, crypts of tonsils, periapical or pericemental infections.

With the knowledge that the portals of entrance to the alimentary, respiratory, and genito-urinary tracts, therefore nearly all mucous membrane-lined organs, ducts and tracts, are the oral and nasal cavities, we must logically reason that these cavities must be free from active virulent infection if the body tissues and fluids are to be considered non-pathologic or normal.

The normal adenoid and tonsils are lymphovascular tissues which act as filters to catch the micro-organisms which are taken with each inhalation.

An absorption of toxines produced by the more virulent germs thus arrested, produces a condition in these tissues which is a reaction to toxic irritation called inflammation, characterized by pain, heat, redness, swelling and impaired function.

Histologically, the changes which occur in these areas of inflammation are hyperemia, stasis, changes in their vascular supply, the blood and walls of their small vessels, productive of exudates.

Pathologically, in these fertile fields the cocci multiply without much tissue change; then the mono-nuclear leucocytes migrate to the inflamed tissues; more exudation occurs which is productive of excellent culture media; the polymorphonuclear leucocytes then invade the field, cocci farther multiply and penetrate the deeper structure of the glands through the 'ymph channels and simple endothelia capillaries, and the polymorphonuclear leucocytes begin the ingestion of the virulent cocci. Practically all of these over-zealous polymorphonuclear leucocytes become pus cells, on account of the toxines of the ingested germs causing their nuclei to fragmentate, which means death to the cell. Infected suppurating crypts or abscesses are present after a period of forty-eight hours of progressively lowered pathological resistance.

As a sequence to this pathological degeneration of the tonsils and the pharyngeal adenoid, a granulomatous inflammation of a suppurative type, which tends to metastisize, is the end result.

When the tonsils and adenoid have reached this chronic pathological state, the internist insists upon tonsil- and adenoidectomy to relieve the patient of metistatic infection.

A granulomatous, suppurative periapical or pericemental inflammation is equally metistatic if not to a greater degree, for we have less drainage here than in the tonsillar infection.

The so-called blind periapical suppurative inflammation or abscess is at least fifty per cent. more metistatic, because the micro-organisms and their resultant toxines and pus are circumscribed by a vascular pyogenic membrane. Therefore all of the toxines and some of the cocci filter by osmosis directly into the circulation.

The discharging abscess is practically equal in virulence to the cryptic infected tonsil, because a portion of the pyogenic material is drained into the mouth and either spit out with the saliva or swallowed The pus which is swallowed is digested by the gastric juices to a degree, and eliminated through the alimentary and renal tracts. However, there always is an absorption of toxines from all foci of infection; therefore it is our duty as a preventive measure to eradicate all foci of infection from the mouth.

Conservation of teeth is our great mission in dentistry, but health conservation is our first duty to our clientele. Therefore we must locate and eradicate all infection from the oral cavity. This does not mean tooth extraction in each case of focal infection, but rather the eradication of the cause of such infection, either by therapeutics and cure of the abscess, oral surgical interference, or the resection of denuded, pitted and infected apical cementum, and mechanical planing or scaling of the precipitation from the cementum of tooth roots in pyorrhea.

If the prognosis of any tooth or teeth is bad and therapeutics, oral surgery or prophylactic pyorrhea treatment will not cure the diseased tooth or teeth, they should be extracted and their sockets thoroughly and carefully curetted free of all pyogenic membrane, the sockets irrigated with normal saline solution and sponged out with ten per cent. tincture of iodin. A healthy blood clot will form in sockets thus treated, and normal fibroblasts from the endothelial cells will be laid down in the clot, healthy granulation will result, osteoblasts will build new, healthy bone at the apical end of the sockets, and osteoclasts will remove the free orificial process and finally the socket will close and the mucous membrane will seal the aseptic area.

We fully realize that our pulp-canal treatment and fillings of the past were far from perfect, but today we can see no excuse for inefficient work along these lines. Each tooth to be, or which previously has been devitalized must be radiographed. If the previously-devitalized tooth is diagnosed by the radiographer as a focus of infection, the dental operator must be able to treat the case successfully or extract the offending member. If the tooth in question has not been devitalized and is to be utilized as an abutment for a bridge, and the radiograph shows a decidedly inaccessible pulp canal, devitalization should not be performed, but a Carmichæl attachment or half crown should be used to support the bridge. If devitalization and pulp canal filling is practicable and cosmetically preferable, the pulp tissue should be removed under absolute aseptic precautions. A sterile wire should be inserted into the sterile canal, temporarily sealed into the tooth and a second radiograph made to see if the apical foramen has been reached. If it has not, the accepted technic of reaming out the canal with barbed broaches and forty-five per cent. sulphuric acid, frequently neutralized with soda bicarbonate solution *a la* Callahan should be employed, the wire readjusted and another radiograph taken to confirm the result. If the wire has reached the apical extremity of the canal, it should be removed and the pulp chamber and canal should be flooded with seventy per cent. alcohol, and thoroughly dehydrated, and filled with a material which will seal the apical foramen and the dentinal tubuli. Possibly the best pulp canal filling is sterile gutta-percha points which are made plastic by sixty or more pumping thrusts into the canal which contains a solution of rosin gr. VIII to chloroform fl. dr. III. This pumping of the points into the canal will partially dissolve the point and force the rosin-chloroform-gutta-percha solution to the apex, filling the accessory cemental foraminæ, as demonstrated by the author of the technic, Dr. Callahan. The semi-plastic material should be manipulated and packed into the canal until the excess of chloroform has evaporated, leaving a firm, non-shrinking, adhesive canal filling. After the canal thus has been filled, a third radiograph should be taken to confirm the final result.

Sterile linen should be used to protect the patient's clothing. The operator's hands, all instruments, dressings, gutta-percha points, cotton and everything used in the operation must be sterile. The rubber dam should be securely adjusted and its exposed surface and the tooth or teeth to which it is fixed should be sterilized with seventy per cent. alcohol before the filling operation is begun.

Surgical cleanliness in this as well as all other dental operations must be maintained. It requires but a few moments of time to perfect the technic and the ultimate results are more than worthy of the time required.

Such attention to details will insure aseptic results and the elimination of the possibility of subsequent foci of infection, which means disease prevention so far as our field of endeavor is concerned.

Hume-Mansur Bld'g.

Successful men never neglect the treatment of a patient's personality. It is always difficult to listen to the recital of an irrelevant family history and of details which are obviously unimportant. The details may be trivial, but it is a fundamental truth that you can not succeed in treatment unless you have the confidence of your patient, and this you certainly will not have unless you listen to the recital of his woes.—*Sir John Collie.*

MOUTH INFECTIONS AND THEIR RELATION TO MOTHERS' MILK*

BY GEORGE BAILEY HARRIS, D.D.S., SC.M., DETROIT.

FROM THE RESEARCH LABORATORIES OE PARKE, DAVIS & CO, IN CONJUNCTION WITH THE DENTAL CLINIC OF THE DETROIT BOARD OF HEALTH

DURING RECENT YEARS there is no subject that has attracted more attention in the field of research than has mouth infections; nor is there any subject that opens such a field for scientific investigation with a promise of uncovering many of the heretofor unexplained sources of infection than do mouth infections. Nor is there any other line of investigation that has uncovered more important scientific facts during the last few years than has this subject. Along with this unfolding comes a new responsibility for the dentist. It has shown that the filling of teeth and the making of artificial dentures, formerly the important part of the dentists' work, goes far into the background, until now he must not only make mastication possible for those who have lost their teeth and preserve or restore the teeth of others, but he must do this in such a way that the health of the individual is not impaired. We know, as the result of these studies, that the health and very often the life of our patients is placed in our hands. But we must meet a responsibility that goes beyond that and deals with the health of the next generation. The very life of the babes whose mothers are under our care. Not only the present mothers but all

Fig. 1
The nursing child receiving death-dealing bacteria in mother's milk.

Fig. 2
The effect upon the child.

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*Written for The Dental Summary.

girls of today, who receive treatment at our hands will become the mothers of tomorrow, and the lives of these babes, which will be born tomorrow, are in our hands today.

We know that the mouth harbors bacteria productive of almost any disease, if it gains entrance to proper soil. We know that mouth infections are very often productive of arthritis, and that the elimination of the foci in the mouth also eliminates the arthritis. We know that decayed teeth and putrescent roots very often become the foci of infections in some distant part of the body. The progressive dentist fully realizes and guards against producing these foci and eliminating them wherever he finds them. How about the nursing infant, when the mother's mouth is loaded with these foci of infection?

Fig. 3
After the elimination of the bacteria by removing the foci in the oral cavity.

Fig. 4
The final result.

Figure 1. Here is a new born child with a mother whose teeth are full of foci. What danger lurks in this mother's teeth that is transmittable to the child through the milk? Cultures were taken from the putrescent canals and all pus pockets in her mouth. Every foci that was revealed by the X-ray was opened and cultures taken. These foci were then elimated. Examination of the material showed the following organisms present:

First: Streptococci p. g. 2d in number. *Second:* Bacilli n. g. small and in clusters. Influenza predominating. *Third:* Micro. n. g. like catarrhalis. *Fourth:* Branching fungus, like streptothrix. *Fifth:* Bacillus p. gram. long slender, pointed ends. *Sixth:* Staphylococci p. g. *Seventh:* Bacillus p. g. long slender pointed ends. *Eighth:* Staphylococci very large and p. g.

Types in order of abundance:

First: B. Influenza. *Second:* Streptococci. *Third:* M. Catarrhalis.

Compare this with an like examination of the mother's milk.

Baccili, short. Streptococci p. g. and most abundant.

A similar examination of this mother's milk after the infections in the mouth were removed showed the absence of the streptococci. Figure 2, shows the child thirteen days after the work of destroying the foci was commenced and Figure 3, shows the same child when the last foci was removed by the extraction of a putrescent root. Figure 4, shows the same child five weeks after the last foci was destroyed.

Another important consideration is the weight. This child lost weight from birth and continued to lose until the foci were destroyed. From that time the child gained, increasing each week, gaining four pounds in one week, which was the biggest gain. This result is doubtless due partly to the change brought about in the health of the mother by the removal of the bacteria in the milk, permitting the babe to grow and use its resources for that purpose rather than combat the pyogenic bacteria given it unknowingly by the mother's milk, must have had no small bearing on the change brought about in this child, in so short a time. It must be remembered that the child had gained one pound before Figure 2 was taken.

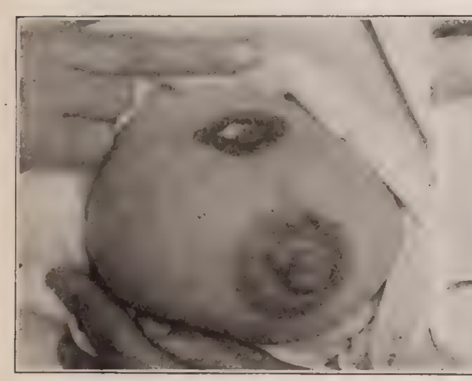

Fig. 5

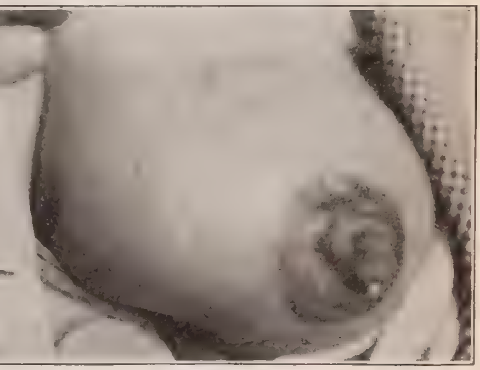

Fig. 6

Figure 5, shows an abscess on the breast. This pus contained:

Staphylococci and Streptococci with baccilli, one of which was likely the B. Coli Communis. The foci in the mouth contained these and other organisms. Attempts to heal this abscess failed for two years but disappeared two weeks after the foci in the mouth were removed. Figure 6, shows the scar that remained. Examination of this mother's milk showed pneumo-cocci and the child had pneumonia during the time the foci were removed by extraction. This child, like the previous one, gained more rapidly after the foci were removed. Figure 7, shows the baby three weeks after the foci were removed. It never gained more than two ounces, in any one week before the foci were removed, and that only once. After the removal of the foci and recovery from pneumonia, this child has not failed to gain at least seven ounces in a week and generally more. The biggest gain to date was one pound, four and one-half ounces.

When a child gains and has been well all through its life, pathogenic germs have not been found in the mother's milk although they were sometimes found in the mouth, but there has not been a single case to date where the child was losing ground that the pathogenic bacteria were not found in the milk and which corresponded to the findings in the mouth of the mother. Also where the child was apparently gaining as much as could be expected, the removal of the foci seemed to produce little if any effect on the child, although it made great changes in the mother's health.

If these findings are correct, every mother who comes into our offices puts the life of her present or future children in our hands. Every young lady does the same thing. The lives of many of the future generations are placed in the hands of the dentist. This is a new responsibility which the dentist must meet. Often the child lives and grows strong or is a weakling or dies in proportion to the careful, conscientious dental treatment its mother receives before or after birth or the careless, poor work of the unscrupulous operator.

Fig. 7

David Whitney Bld'g.

RATIONAL ROOT-CANAL FILLING*

BY HARRIS R. C. WILSON, D.D.S., CLEVELAND, OHIO.

THE MEMBERS of the Cleveland Dental Society have listened recently to some of the foremost men of the professions, Mayo, Hartzell and Black, upon the profound subject of the relation of oral infection to systemic disease; and I believe we have been sufficiently impressed with the importance of most careful study and thought relative to the dental aspect of this work, that I need not elaborate upon the subject other than to call your attention again to a few significant facts.

In an examination of the patients at the University of Minnesota hospital, it was found that of 1350 pulpless teeth 83 per cent. showed apical abscesses. We are also told that 68 per cent. of all artificially devitalized roots showed apical abscesses. (Dr. Ulrich, in *Journal American Medical Association.*) With these two facts we must be impressed with the responsibility upon our shoulders.

We are all familiar with the long list of fatal diseases now known to be caused by foci of infection somewhere in the body. We know that the apical abscess is the most common primary focus leading to disease that may mean an early grave.

Is it not our duty to humanity to stop the practice of "septic dentistry," as Dr. Hunter so aptly describes it, and correct the evil we have done in bliss and ignorance? I believe it is, and I believe that every man present is ready and anxious to learn and practice better dentistry.

The time has come when we must change radically many of our ideas of both theory and practice. There are three points that I wish you to think upon with me for a few moments:

First: How shall we protect our patients from the menace of present conditions about most, if not all, pulpless teeth? Whenever a patient presents with pulpless teeth, even if we have filled the roots ourselves, and are *sure* that they are well filled, let us have Roentgenograms made and see the conditions. You will be surprised, perhaps, to find apical abscesses or areas of rarification about most of the devitalized teeth. Our duty is to advise the removal of all such teeth unless we have some means of establishing asepsis in and about the roots, with reasonable hope of maintaining that condition.

Second: How shall we protect our patients from the possibility of future dental foci of infection? Let us never devitalize a tooth if possible to keep it alive, for there never has been and never will be as good a root filling as the vital pulp. To devitalize a tooth for the sake of placing a bridge I consider absolutely criminal in the light of our present knowledge.

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*Read before the Cleveland Dental Society, May, 1916.

Third: The most important duty of the dentist today is to care for the teeth and mouth of his patient, and to teach him the proper care and use of his mouth to the end that there will be neither decay of the teeth nor disease of the surrounding tissue. This means that we must devote time and study to methods of efficient prophylaxis.

With the knowledge gained by experience and from the abundant literature of the past few years upon the subject of oral infection, the writer is almost persuaded to advise the removal of all devitalized teeth. However, we are still clinging to the straw of hope that effective methods of root treatment and filling may be developed that will make it possible for us to preserve for our patients pulpless teeth in a useful and aseptic condition, avoiding the menace to life that now exists in every mouth having septic areas at the apices of the roots of teeth.

In presenting the subject of Rational Root-Canal Filling it is not with the idea of giving a technic that is absolutely perfect and will care for every canal, for that is beyond our ability. Every root canal that can be cleaned can be filled. Without being pedantic we wish to state that neither a root canal nor the dentinal tubuli can be filled until we have removed the contents placed there by nature or by the processes of disease.

Let no one think for a moment that I am able to clean all root canals. I cannot and I frankly admit it. When I find from a Roentgenogram that a root canal turns at a right angle near the apex I at once give up and waste no time upon the impossible. Should the canal be slightly curved toward the apex and very fine, I would attempt to follow and enlarge it, which in many cases is a tedious and trying operation.

The technic of opening canals is not the subject before us tonight, but permit me to insert a thought or two in the way of suggestion. Were there any one method of performing each given operation, that was always a success, dentistry would cease to be a profession and become a trade, for there would be no need of intelligent thought and judgment due to experience, which is the element that marks the difference between the profession and the trade.

The removal of pulp-canal contents requires instruments and drugs. Many varieties of instruments, broaches, etc., have been devised for this work and all have their advocates who have learned to accomplish the desired results with their chosen instruments. Drugs: here we have a varied assortment of ideas as to the desired chemical action within the pulp canal, and again a most varied assortment of ideas as to the action of the medicaments we use; and I regret to say that too many have few ideas as to the desired or accredited action of our common medicaments in and out of the pulp canal.

Let us be exceedingly careful that we do not insert into a root canal anything that may add to our problem. The writer is becoming convinced that there are several, if not many, drugs in common use that are really doing damage rather than good both within and immediately adjacent to the root canal.

We hope that a careful study of drugs may in time reveal their chemical action upon vital and dead tissue, and that we may come to know, not guess, as to what drugs should be used if any are indicated. I confess my ignorance with regard to the action of sulphuric acid, but from all I have learned from the writings of others and from experience, I believe that 50 per cent. sulphuric acid (liquid) is the best agent for chemically changing the structure of the dentin, making it possible to remove with broaches. However, I am satisfied that the use of sulphuric acid is attended with injury to living tissue in many cases.

In my hands the barb broach is the most satisfactory as a reamer or rather as a rasper of root canals. Files and twist broaches are more acceptable to some of you, and I would make no argument on this score. Let each man use the instrument that suits him best.

As to the filling of root canals, a few general considerations should have attention. The material used—

Should be non-irritating to living tissue.
Should be non-putrefactive.
Should be aseptic.
Should be opaque to the Roentgen ray.
Should remain permanently as inserted.
And last, but not least, should be capable of reasonably easy insertion.

Cotton absolutely does not meet these requirements. Gutta percha is an organic material capable of becoming putrid. It shrinks from the walls of the canal and usually is combined with irritating drugs, therefore should be excluded.

Metal points alone are adapted with such difficulty as to make the method almost impossible. Oxychlorid of zinc and similar metallic salts have been given slight study by me for they seem too porous and too difficult of insertion, as well as irritating to the periapical tissue. Mumifying pastes are excluded for obvious reasons.

It seems that a material must be liquid to be capable of proper insertion in a root canal. This has led many men to work with solvents for a hard material which has made it possible to nicely adapt gutta percha to the walls and through the foramina of root canals. The solvents are irritating (an objection), and when evaporation or absorption has taken place it seems to the writer that there must be space between the gutta percha and the dental tubules, which idea is confirmed by clinical experience.

We know too, that canals well filled with gutta percha, inserted with a solvent, will yield cultures of streptococci even when no area of rarifaction is evident from a Roentgen examination.

One method of root-canal filling has been presented that theoretically, and I believe clinically, meets the requirements when we have an aseptic condition to start with. I refer to the use of paraffin as presented to the profession by Dr. Hermann Prinz, of Philadelphia.

While it is true that an unsuccessful attempt to use paraffin was made some twenty years ago, and some seven or eight years ago the French revived the same without much success, I believe that today we have a technic that is right; and if clinical evidence is favorable for a few more years we will be able to say that paraffin is the material par excellence for filling root canals in a manner that will maintain aseptic conditions.

The technic after the removal of all debris and drugs used for cleaning the canal, is as follows:

In every particular observe scrupulously aseptic methods and get the "aseptic habit." Pardon me for emphasizing and repeating "aseptic habit," but it is worth repeating.

Rinse the canal with sterile distilled water several times that all debris and all trace of drugs may be removed thoroughly.

Dry the canal reasonably well with J. & J. sterile absorbent points. Then flood the canal with 95 per cent. alcohol, pumping the alcohol well to the apex, using a J. & J. point. Then absorb the alcohol with the same points.

After using the alcohol, some of you no doubt have had trouble with a slight but persistent seeping of serum at the apex. This is overcome by the use of acetone and thymol (5 minims of acetone to ½ grain of thymol), flooded into the canal and pumped to the end with an absorbent point. Allow the acetone to remain in the canal for a minute.

Again dry the canal with absorbent points until no moisture appears upon the tip of the point.

Next, with a very fine sterile silver point, electrically heated, dry the canal. When the point is first applied to the canal, if you listen carefully, you will hear a hissing sound. As soon as the hissing sound has ceased the canal is dry.

The dry canal should now be lubricated with petrolatum. Dip a sterile absorbent point into the petrolatum so that one centimeter of the tip is moistened, place this point in the canal and wipe the canal for a second or so and then remove.

The canal is ready for filling, which is best accomplished as follows:

A length of sterile paraffin root filling, previously cut into four or five parts, one of which, one-eighth or three-sixteenths of an inch in length, is placed at the orifice of the canal with sterile pliers. With the fine silver point used to dry the canal, starting with the point *cold* and having the current turned on, begin to tease the paraffin into the canal with a rotating motion. As the paraffin melts the point is removed and the paraffin will take the place occupied by the point. This is repeated until the canal is filled.

Now use a coarse (No. 6) root canal plugger, *cold*, to crowd the paraffin to the apex and through the apex if it so happens.

Remove any excess paraffin from the pulp chamber and from the orifice of the canal and cover with a portion of high grade cement.

Now have a Roentgenogram made to see that the canal is well filled and, if it is not, try again.

I will try to answer some of the questions in your minds and save you the trouble of asking them.

We always use the rubber dam in root-canal work.

We always sterilize the tooth and rubber with alcohol before opening into a tooth.

We never touch an absorbent point with the fingers. We touch it only with sterile pliers and sterile scissors.

We never wrap cotton on a broach with our fingers. We use Dr. Hermann Prinz' formula for root-canal filling: Paraffin 68 per cent., thymol 2 per cent., and bismuth tri-oxid 30 per cent., prepared by the S. S. White Co. The bismuth is used solely to make the preparation opaque to the Roentgen ray, and 30 per cent. is all the paraffin will carry and have proper working qualities.

Some may feel that it is difficult to fill a canal with paraffin. If the technic has been right the canal will be dry and will take the molten paraffin readily.

The paraffin will from its nature adhere to the lubricated wall, forming a funnel in the center of the mass rather than leaving the sides of the canal.

Both theory and practice indicate that paraffin is the material best suited for the purpose, but we must remember that paraffin has not been long in use for this purpose. Personally, I have used it for a little over two years.

If every member of this society would make liberal use of the Roentgen ray, having a picture made before work is started, when the work is completed, and then after one year, and another two years later, we would soon know the results of our efforts in filling root canals.

In conclusion, I wish to say that we are treading on most dangerous ground when we attempt to preserve a pulpless tooth; and I assure you we assume a grave responsibility when we fill a root canal, for no matter how well we have performed the operation there is still doubt as to the health of the periapical tissue after our interference.

With all the effort that is being expended to learn a technic for the preservation of pulpless teeth in a healthful state, the writer will not be surprised if we have to conclude that it is necessary to condemn to the forcep all pulpless teeth.

I am grieved to know that some of my confreres are not alive to the situation and that they are still practicing "septic dentistry" and surely sending their trustful patients to early graves.

How many innocent lives must be sacrificed before we rise to meet the challenge made by Dr. Mayo that, "The next great step in the conservation of human life must come from the dental profession"? And that step is, if I see correctly, to practice aseptic, surgical dentistry, not forgetting the individual tooth but always giving first consideration to the health of the entire human body, when we attempt to restore a crippled mouth to usefulness.

I beg of you not to let a single pulpless tooth coming under your observation go unchallenged, but ascertain if it be in a healthful state. I venture to say that you will find most of the pulpless teeth a menace to their host if not an active source of poison. I do not wish to criticise the men or methods of the past, but I do severely condemn the continuance of these methods in the light of our present knowledge.

You will note that there are many suggestions in my paper affording subjects for study, and perhaps not a great number of absolute statements. This condition is necessarily so, due to my unsettled state of mind upon this subject. No one yet knows what the next few years will bring forth, but I warn you to be prepared for radical changes which will be backed by the findings of our present-day research.

OUR FUTURE PROFESSIONAL HORIZON*

BY. A. R. ROSS, D.D.S., LA FAYETTE, IND.

IN AN ATTEMPT to forecast our future professional horizon, it is necessary for us to estimate roughly the present standing of the dental profession in its more important activities. How do we measure up as a profession at present?

As a national organization, we do not show as good a rating as the horse doctors. This was shown rather clearly in efforts which were made during the past winter to secure reasonable recognition in the reorganization of the Army Dental Corps. The National Secretary could give some very disheartening testimony as to the lack of cooperation existing in the profession. This is evidence of what poor business men the majority of dentists are. That they do not have a broader conception of fundamental business principles, with particular application to their profession, is due largely to lack of any business training being given them in the dental colleges. There is no reasonable excuse in this age of organization of all professions and crafts for a body of intelligent men to fail to recognize that through organized effort the lot of the individual is bettered There is no excuse whatever for business men to neglect their correspondence continually as so many dentists do.

In the estimation of book agents, wildcat stock salesmen and get-rich-quick promoters of various types, dentists as a class are credited with being about the easiest marks to do business with. Is that anything for us to feel proud of?

In the estimation of the general public, the profession has been commercialized to such an extent that eighty per cent. or more of the patients of the majority of dentists think of the cost, rather than the service, when in need of dental treatment. The same percentage of patients will think of a physician's service from the viewpoint of their curative need and the element of cost will be secondary in their minds. This attitude of the public toward the dentist is encountered by all members of the profession with the exception of a few practitioners in our larger cities, and is largely due to the advertising "dental parlors" giving widespread publicity to prices for dental "work." It is questionable if any dental-parlor advertisement ever appears which does not promise painless operations or give a scale of prices, and usually both features are present. By always advertising dentistry as painless, people are convinced that there must be considerable pain involved, or it would not be necessary to give such constant assurance to the contrary. As a consequence, people generally defer visiting the dentist until driven by actual suffering; the operation is then likely to be painful to some extent. When advertising parlors publish lists of prices, which are often fictitiously low as a bait for business, the dentists in even the smallest towns are subjected by their patients to a comparison of their prices with the published price-list appearing in the city newspaper. The public does not know that fictitious prices are featured in the advertisements as a bait to draw business to the dental parlors, and the dentists as a class are such poor business men that they feel it is necessary to talk prices in order to offset this kind of competition. Some dentists even try to meet these fake prices, and the effect throughout the profession generally is such that dentists today are listed as insufficiently paid for their services when compared with other professions. Whatever justification of their methods of practice is claimed by advertising dental parlors, is more than offset by the pernicious and commercializing influences they are constantly exerting and strengthening in the public mind.

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*Read before the Indiana State Dental Association, May, 1916.

In the estimation of the medical profession, dentists have been denied the recognition they should have received. Physicians have not recognized sufficiently the importance of the teeth and adjacent tissues as important factors in the health of the individual, and even the dental colleges have neglected, in the past, to instruct their students sufficiently in some of the allied sciences, which would enable them to more clearly grasp the seriousness of some questions with which we are now confronted. It is only within recent years that a realization has been coming to physicians and dentists of the importance of the teeth as sources of the most serious systemic infections, and today dentistry finds itself challenged by the medical profession to meet the new responsibilities that have come to it. What are we going to do to measure up to our responsibilities and how are we going to do it?

In preparing to meet our constantly increasing professional responsibilities, it is necessary for us to work intelligently and unitedly. One of the principal factors which we have to help us to broaden our professional horizon is the Research Institution of the National Dental Association. We should support this department of investigation not only through our membership in our State Dental Association and through individual cash subscriptions, but we should also use every effort to influence every eligible dentist to join with us in making more effective the service of our profession to humanity. It is only through an efficient National association operating through equally efficient State associations and their respective component societies, that we can hope to fulfill our duty to the public. With such an organization the maintenance and development of the National Research Institute can be insured, and increasingly important knowledge be given to us which will enable us to render more efficient service to humanity, and thereby merit more respectful recognition from the medical profession and the public at large. With such an organization the establishment of dental clinics in the schools of our cities can be encouraged. Instruction in oral hygiene can be effectively distributed. Desirable national and state legislation can be secured which will protect the public from the unscrupulous charlatan, and elevate our profession in requiring a high type of proficiency in applicants for licenses to practice.

Dentistry is rapidly developing a higher type of service, and the future gives promise of still higher attainments by our profession, if we can measure up to the graver responsibilities demanded of us. The most important operations in the future will not be the repair of destroyed tooth structure nor the replacement of lost teeth; but will be those operations and remedial measures which we will employ to prevent or cure serious systemic diseases, due to infection from teeth and mouth. This, a higher type of service, calls for better preliminary scientific training and a more thorough knowledge of anatomy and its allied sciences. That the dental colleges fully appreciate the truth and importance of this change is shown by plans already adopted to lengthen their course of study to four years.

As the public becomes better informed of the serious results which may follow neglect of the teeth, it will grant to dentistry nore respectful consideration. With intelligent and persistent instruction to the public, its present commericalized viewpoint toward the profession will disappear. This very desirable intelligent and persistent instruction to the public can best be promoted and maintained through an efficient National association and its respective state associations. Through such an organization an educational campaign throughout the country can be inaugurated and persistently maintained to the end that the public will be impressed with the necessity of careful attention being given to its teeth. Such an educational campaign constantly emphasizing the possibilities of infection from neglected or improperly treated teeth, and continually featuring the need of intelligent service, will counteract in a large measure, the commercializing influence of the advertising parlors in always publishing price-lists. It will take printer's ink in large quantities to offset the use of printer's ink by the advertisers, but the future of the profession will be materially elevated and strengthened by such publicity.

The individual dentists can assist effectively in such educational work. They should never volunteer to quote a price on any operation. When asked for information as to the probable cost, their answers should be general rather than specific, and they should never use the term "price" but use instead the word "fee." They should think and talk of the *service* they are giving, and not of the fee they expect in payment therefor. By never speaking of the cost of an operation except when necessary, and by always impressing on their patients the viewpoint of *service*, the future will grant to the dental profession a freedom from commercialization approaching that now possessed by the general medical profession.

If we are to broaden our professional horizon, it is important for us to fully realize the necessity of united effort. Individual and often conflicting activity on the part of dentists never will realize any permanent gain for the profession. To promote national legislation, it is necessary for us to be able to bring influences to bear from every state in the Union. In promoting or protecting state legislation, it is equally important to have an effective state association, made up of component societies representing every portion of the state. To educate the public and secure a higher recognition for the profession in every community, it is necessary to have effective component societies to do the active work in the respective localities. We must set aside professional jealousy toward practitioners in our respective communities and learn to work together. Why be jealous of one another? Professional jealousy never made one dollar for any dentist and certainly lowered his self-respect. With approximately but fourteen per cent. of the necessary dentistry being performed in this country, it would seem to be good common sense for us to initiate a united and continuous crusade to educate the public to the realization of its dental needs. We can increase the demand for dental service and thus increase the financial income of every dentist Is this not worth while?

We should not consider our fellow-practitioner as a competitor; it is far better and more sensible to cooperate with him in every way in elevating the profession in public estimation. All professions and crafts are perfecting their organizations, as they more and more realize that the welfare of the individual member is bettered by organized effort. What is true of the legal and medical professions is equally true as applied to our profession, if we will but realize it and act intelligently. In every line of industry throughout this entire nation there is a gradual transition from competitive to cooperative production; and it is impossible for dentistry to realize its proper function in the welfare of the people except through united effort.

Our neighboring states, Illinois and Ohio, are thoroughly organized, while at this writing Indiana has but four component societies, embracing a combined territory of but eighteen and one-half counties out of the ninety-two counties of the state. Seventy-three and one-half counties are still to be organized; and since the State association has no funds with which to finance organization plans, it is necessary to depend on the dentists in the respective communities to perfect their respective societies. In selecting a territory for the formation of a component society, the dentists of that locality should not be concerned with congressional district boundary lines, nor should they be limited by definite counties; but a territory should be chosen from the viewpoint of convenience of transportation of the members When necessary a portion of a county only should be taken in, where it would be inconvenient for the dentists of the balance of the county to attend the meetings. Some of our members located in the district should petition this Association to be chartered as a component society, having jurisdiction over the territory selected. After a component society is chartered, all applications for membership within its territory are referred to the Board of Censors of that component society, to which all such applications must be presented. Upon approval and election to membership by the component society, the applicant automatically becomes a member of the State and National associations, the entrance fee to the latter two associations being collected by the component society. Furthermore, a chartered component society collects all component, state and national dues from its members. Every member of a component society must belong to the State and National associations, and no dentist within that particular territory can belong to the State and National associations without belonging to the component. This requirement is obviously necessary if dentistry is to exert an influence comparable to that of other professions, whose organizations have been perfected along similar lines.

Since dentistry is our life-work, we certainly should be interested in any movement that will elevate the profession and broaden its influence. There is no good reason why Indiana dentists should not prove themselves as progressive as the dentists of Illinois or Ohio. All of you are earnestly solicited to interest yourselves in this important movement, to the end that our profession may exert a greater influence for the welfare of humanity, and that we as individual dentists may merit a higher standing in our respective communities by virtue of our broadened professional horizon.

DISCUSSION

DR. CLEM SHIDLER, South Bend: I wish every member of the society would thoroughly digest what Dr. Ross has said, and I think if he does, there will be no necessity for the discussion which I shall try to bring forth.

We are to a large extent responsible for the lack of recognition by the medical profession If we have a local organization, where the local men get together and take up subjects, and become of some force in that community, they immediately become more readily recognized by the medical profession. But often we have things coming up like this: A child was brought to me some time ago, and I put a small gold filling in a six-year molar. It was a child of twelve. She came back with her father, a very intelligent gentleman, with the report that Dr. So-and-so, a very estimable and reputable physician, sends this little girl up here and he wants you to take that filling out. Why? There is a swelling down there under the jaw, and he says that tooth is causing it, and he wants the filling out, and wants you to treat the tooth. I knew the condition under which the filling was put in, and I refused to take out the filling, knowing that there was no necessity even for a cement lining. I went over the case carefully, and found there was some excuse for the physician taking the stand that the trouble was due to dental origin. However, I did not think it sufficiently strong to remove the filling. I told the patient to wait until the afternoon and see what condition presented itself at that time. In the meantime, knowing that mumps was quite prevalent in that section of the city, I casually mentioned that fact, and that this was probably a case of mumps; that I couldn't tell anything about it; that a physician could tell them; that was outside of my jurisdiction.

The patient did not come back, and Monday or Tuesday I saw the father and asked him how the little girl was getting along. He said; "That is a joke, which I will tell you about. We have a fine case of mumps down at our house." Now, if I had listened, as sometimes we do, to the physician's diagnosis of the case, what would I have done? I would have removed the filling and attempted to go into the pulp chamber, which was as live as could be, and would have done her an irreparable injury. We should get together on those things. This same physician has referred a couple of patients to me for diagnosis. I took it up directly with this physician, and he saw that my point was right.

As to this matter of component societies, I do not think Dr. Ross' statements require any comment at all. From the "Bulletin" just received, I want to read the article, "The Function of the Component Society." (Reads page 18—which see.) I want to acknowledge right here that I have done very little in the way of organizing component societies. The organizations that have been effected have been due very largely to their own efforts and not to mine. But I am here to make any reparation I can for my lack of attention to this work. About eighteen and a half of the counties are organized, and the rest is all unorganized territory.

Dr. Ross: (Closing.) Relative to the discussion of Dr. Shidler, he has endorsed everything I have said, and the whole purpose of it is to awaken in the minds of the members a realization of the fact, which I believe to be fundamental and incontrovertible, that it is necessary for dentists in the respective communities to dispel any little personal jealousy that might exist and get together in a spirit of good fellowship, if they are going to place the profession upon a higher standard in their respective communities. I do not believe that time spent in creating this good fellowship among practitioners in any particular community could be spent to better advantage in any other way, and I earnestly urge upon the members of the Indiana State Dental Association that they do their utmost to measure up to the increasing responsibilities of this profession, and that we may realize by our broadened professional horizon the respect that is our just due.

EXTRA HEAVY REINFORCED GOLD CROWNS*

BY G. A. FOLLETT, D.D.S., AMBIA, IND.

The main object of this clinic is to show the necessity of an extra heavy reinforced crown in cases where the opposing teeth are artificial dentures. A gold crown made in the ordinary way will often wear through within a year. By this method one can build a crown as thick as he wishes, making one that will last as long as it will take the other teeth to wear to the surface where this tooth was ground off in the preparation for the crown. The crown is made up by first preparing the root and noting the bite of opposing teeth, grinding the same down to a square surface, leaving a space which you can see during the process of, for instance, nearly one-eighth inch. After fitting band and trimming off square, even with the square surface of tooth, you solder your gold, about 30 gauge, squarely over the surface, and then you invest the same with the occlusal surface exposed, and then melt 18 karat solder on it, melting about one pennyweight. This will just boil up and make an oval surface, and then mount crown on a pine stick and trim with burs and small stones during the time you are fitting it on the tooth to articulate properly. Polish and cement.

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*Clinic Indiana State Dental Society, 1916.

DENTAL ORTHODOXY*

BY H. C. SEXTON, D.D.S., SHELBYVILLE, IND.

IN ALL PROFESSIONS, businesses and arts, it is well at times to take a survey of values, to question all standards, in order to be sure that we are not encumbering ourselves with false beliefs; beliefs which may have been valuable at some stage of our existence, but which have today outlived their usefulness. All machines, even human ones, at times need adjustment; and this consideration of values, this questioning of all standards, is in essential an adjustment. The belief that is most serviceable in one generation may not be the best one for the next. The destiny of all beliefs is to die and fertilize others; and so we should try to keep ourselves open-minded in regard to all things, and should never allow ourselves to assume the attitude that truth is already a settled question—settled forever.

Truth, after all, you know is only relative. There is no absolute truth. William James and the other pragmatists have proved that. There is even no absolute code of morals. Morality in its inception was only that which was most expedient to the general welfare. But what was most expedient in one country, or race, or climate, was not most expedient in another country, race, or climate. Therefore philosophers have held that an absolute code of morals, a code for all time, is an impossibility.

The greatest of all modern German philosophers is Nietzsche. His influence in the formation of modern German thought is paramount. Nietzsche will stir an Anglo-Saxon brain deeper and create more anger in it than any writer who ever lived. Few can follow him to his full lengths, but to nibble at him is wonderfully stimulating. I want to quote one paragraph from his "Dawn of Day:"

"Contumely always falls upon those who break through some custom or convention. Such men are, in fact, called criminals. Everyone who overthrows an existing law is at the start regarded as a wicked man. Long afterward when it was found that the law was bad, and so could not be re-established, the epithet was changed. All history treats almost exclusively of wicked men who, in the course of time, have come to be looked upon as good men. All progress is the result of successful crimes."

Now the thought occurs to me that we in dentistry may have some laws or customs handed down to us by our fathers that it were well to question, to question severely. Perhaps some of the criminals in our own profession have some things that can be said for them, perhaps even they are only heralds of a different age that is dawning.

Some one has said that orthodoxy is my doxy and heterodoxy is the other fellow's doxy. That is a striking expression but in my opinion it is not overburdened with accuracy. Orthodoxy, I should say, is the doxy we have adopted from our fathers; while heterodoxy is, in most instances, the doxy of the fellow who has done some thinking for himself.

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*Read before the First (Ind.) District Dental Society, 1915

A great American once said: "By orthodox I mean a man who has quit growing, not simply in religion but in everything; whenever a man is done he is orthodox; whenever he thinks he has found out all, he is orthodox; whenever he becomes a drag on the swift car of progress, he is orthodox."

In the preparation of this essay it is far from my thought or intention to lay down a new code of morals for us dentists; but there are some opinions generally held that I think it well to reconsider. So let us open our minds to some things that are not professionally orthodox. It may be that we can learn something. It may be that some things believed in by our fathers it would be well to relegate to the shelf. At least some consideration of them will do us no harm. If we have some beliefs that are dead, let us bury them. If they are still alive and deserve to be kept alive, then they have nothing to fear from our investigation. They will survive and be all the stronger. We should beware of the creed or the code or the custom that is considered forever settled. To progress means to question all things at all times. Nietzsche truly says: "The snake that cannot cast its skin, perishes. So, too, with those minds which are prevented from changing their views: they cease to be minds."

A great educator, David Star Jordan, has said: "Pure religion and undefiled has never claimed for itself orthodoxy. It has no stated ritual and no recognized cult of priests. Much that passes for religious belief among men has no such quality or value. It is simply the debris of our grandfather's science."

Now what is true of religious creeds I think is also true of professional creeds. Every generation needs modernising. And of customs and unwritten beliefs this is even more true than of written creeds or codes. They must be changed to suit modern thought and advance. Not to change —well, that way lies death.

The first question that I want to consider is our professional scruple against the use of the public press. A generation ago it was unquestionably better to leave the press severely alone, for advertising in those days was all that was reprehensible. Then every fraud, every dishonest article of merchandise, was lauded loudly in the advertising columns and not only there but even in the editorial and news departments. Newspapers had no morality, no code of ethics on the advertising problem. No matter how injurious the medicine might be, no matter how rotten the article of merchandise, a eulogistic advertisement of it was always inserted if the advertiser would pay the price. Money was the only consideration. The motto was *caveat emptor*—let the buyer beware.

But now a great change has come over the reputable newspaper business. The paper feels its responsibility. It has developed a conscience. Dishonest advertising is still occasionally found, but it is seldom found in the better class of papers. Advertising men themselves are working hard to eliminate all dishonesty, and they have accomplished much. The Associated Advertising Clubs of the world have many thousands of members. Over five thousand of them were at one meeting recently in Chicago. The emblem of the association is the word, "Truth," superimposed upon a map of the world. Mr. Merle Sidener, of Indianapolis, is chairman of the Vigilance Committee of this organization. If any newspaper or other advertising medium would know the standing of any person or firm offering an ad., let it apply to this Vigilance Committee and the matter will be looked up in its minutest detail. Even Uncle Sam has had his conscience aroused, and now the mails are forbidden to all questionable concerns. Many rascals are now in the pen for that one thing alone—dishonest advertising through the mails.

Some of our best newspapers not only have declined to receive questionable advertising, but even have conducted active campaigns against all dishonesty in public print. One great Chicago paper has within the last few years almost exterminated medical and dental quack advertisers in Chicago by exposing them and their methods, one after another. This same paper also exposed the dishonesty in their State Board of Examiners, whereby questions were sold prior to date of examination. Surely a great and commendable work!

Did anyone ever hear of newspapers doing anything like that a generation ago? Indeed no. But today the newspaper advertising man has a different ethical standard from that of his father. He has grown and he has become respectable.

But how does that alter or how should that alter the attitude of the ethical dentist toward the press? I will try to tell you:

We dentists have a wonderful message to deliver to the people—to the mass of them who are in darkness. Various estimates of from ten to twenty per cent. have been made of the number of people who really look after their mouths and teeth as they should. We have always known the number was small, but in past years we did not consider it a serious matter. Teeth were thought to be more for looks than for anything else, and nobody realized that a bad mouth always meant poor health. But we do realize it now, and our brothers in the medical profession realize it also. The importance, the all-importance of a healthy mouth, is beyond matter of dispute.

But the masses of the people are ignorant of this and it becomes our duty to teach them; no others can. In this matter of instruction we have accomplished something by talks to pupils in the schools, but we have not accomplished much. If, after Johnny is told he must brush his teeth three times a day, he goes home and finds out that neither his father nor his mother have brushed their teeth in months, then I fear the lesson is all lost. We must have some way of instructing the older people, not only for their own sakes, but also for the sake of the children who look up to them.

The press in a free country like this is the greatest power we have; its influence is greater even than that of the church. Every man has his favorite paper and reads it every day. About one man in ten goes to church once a week.

Now, what have we done with this public press, the greatest power in modern life? We have turned it all over to the least reputable part of our profession—the quacks. Here, we say to them, is the greatest influence in modern civilized life; take it and use it as you choose; we hand it all over to you; of course we have a wonderful message for the people, a message that may mean life or death to a great many, but they must come to us for it; we are not going out of our regular ordained path to give it to them; no, no, that would be unethical; let them die first.

And by our attitude we have earned the contempt, if not the open hostility, of all newspaper men. They look upon us as dwarfed, and small, and picayunish, and as cherishing the attitude of the pharisee.

What always has been objectionable about professional advertising? The objectionable part is the vaunting of our own ego. When a merchant advertises he praises his goods, the product of other men, of manufacturers; when a professional man advertises he praises his own skill, he shows his conceit, his egotism, and above all his bad taste. A merchant may plaster a whole page over with praises of his goods and still be a gentleman. A professional man who publicly claims a higher degree of skill than others in his calling, is not a gentleman, whatever else he may be.

Advertising, then, is a justifiable procedure if it be done in such a way as not to offend good taste. Is it possible for a profession to do that? Yes, I think so. The way to do it is to cut out personality. Let us use the press, not as individuals, but as a whole. Let us deliver our message with the weight of the whole profession back of it. I think every society should maintain a newspaper publicity department for the education of the public in oral hygiene, and that department should be the most pushing, most progressive, most keenly alive of all.

Of course this is very unorthodox, but in remembrance of the aut orities quoted above, isn't there such a thing as dentists being too orthodox? Isn't there danger if we always model our standards after those of our forefathers that we become mere copies overgrown with moss? Shouldn't each generation think out its own problems for itself? I think it should. But the demand for ready-made opinions is about as wide-spread as the demand for patent medicines. We have been raised upon the pap of opposition to the public press. It is hard for us to open our eyes to the fact that here is a great power we should use for the benefit of mankind, and incidentally for our own benefit as well. How foolish to give up this greatest of all formers of public opinion to the most disreputable members of our profession! Aye, worse than foolish; it is criminal.

There is one other matter in which we as a profession are, I think, too orthodox, too hidebound. That one, however, is very, very important. I refer to fees, and here we are getting down to bedrock.

In our meetings we hear a great deal about big fees; and from a great many of the speakers we get the impression that unless we are boosting our fees, and unless we are getting five or ten dollars an hour or more, we are unworthy members of our profession. One man from Chicago I heard declare that his income from practice averaged twenty-five dollars an hour; and he insinuated that unless we were doing as well, we were neglecting our opportunities, and were members of the family of fools.

Now, let us consider this matter for a few minutes, not from the standpoint of our pocketbooks, but from the standpoint of our hearts, our human sympathies; that will tell us a different tale, if I am not mistaken.

Oral hygiene, our new knowledge of oral hygiene, teaches the overpowering importance of care of the teeth. We know now that a bad mouth means incapacity, disease, sometimes death. Eighty per cent. of the children in our public schools have carious teeth. We point out these terrible truths; we create a demand for popular-priced dentistry; what have we done to supply this demand? I'll tell you what we have done—we have increased our fees! We have done scarcely anything else. We have introduced many new methods and appliances into practice, and almost invariably the strongest plea that is made for them is, that by adopting them we can get more money from our patients.

Now, isn't that a motive of which we should be ashamed? The first consideration of any profession worthy the name should be *to do the greatest amount of good it can do to the greatest number of people.* When it loses sight of that ideal and puts all its endeavors into squeezing the most money it can out of its patients, in the least possible time, then it becomes unworthy the name of profession. It puts itself on a par with Jew pawnbrokers.

Let me tell you of conditions in my own home town. Every man knows best the state of affairs in his own home, and from that knowledge he judges the rest of the world.

In my home town we have over two thousand men working in furniture factories, whose average wage in prosperous times is about eleven dollars a week. For a year or more, now, they have had work only a portion of the time. These men have wives and children to support; they must buy food and clothing, and they must provide homes and fuel. How much do you think they have left from their wages after paying for those things? How much have they left with which to pay dental bills for themselves and wives?

But let us not consider the adults; they have neglected their teeth most of their lives; we can't reform them; let their mouths go to ruin. There remain the children, eighty per cent. of them more or less incapacitated by bad teeth. We lecture to them in school, telling them they must have their teeth cared for; their health, their development, their success in life depend upon it. An enormous new demand is created upon our profession. Our mission in life is to relieve suffering humanity, to save the health and lives of little children.

Look into your hearts and tell me: Are we doing our whole duty when we meet chiefly to talk about raising our fees, to tell what we get for certain operations, and to complain that we do not get more? Ah! let us take the matter into our hearts; we have had it in our brains long enough. Our brains are cold-blooded, selfish machines. Our brain has said: Make the present an opportunity to crack up fees. We have stifled our hearts. It is time we listened to them awhile. It is time we came back to true ethics, true morality. "Do unto others as ye would that others should do unto you." In that one sentence lies all true professional ethics, even if it does conflict with our present code.

Some may think that the workers of our town are in an exceptionally poor plight, but it is not so. The average wage of our town is as good as elsewhere, else our factories could not keep their employees. In the Indianapolis City Library I asked for a reliable volume of statistics on wages and was referred to the Dictionary of Statistics published by Geo. Routledge & Sons. That volume gives the average weekly wage paid by factories in the United States to men over sixteen years of age, as $11.32. That is the average, mind you, and for every man who gets fifteen dollars a week several others must get less than the average.

From my home I go to dental meetings and listen to talks from eloquent men who have practises among the wealthy in the cities, and charge extravagant fees. They seem to think I am an unworthy member of my profession when I charge only one dollar for an amalgam filling. I listen to them with conflicting emotions. Am I really a disgrace to my profession? Are they, after all, right? Is there but one criterion worthy of consideration in this world—the criterion of dollars and cents? Is the best dentist merely the one who can charge the biggest fee?

In an examination of children's teeth in the schools at home, we dentists found several thousand sixth-year molars carious. In spite of our education of parents, teachers and pupils I doubt if twenty per cent. of them ever were filled. And the reason with most who did not have them filled was expense. I know I am guilty. I feel guilty. I never have had the heart to propose another examination of teeth in our schools. It is cruel. Those children should have had service. But at present our professional spirit of service seems to be decadent. We have given ourselves over entirely too much to the spirit of gain. I have heard many papers advocating the boosting of fees. I have yet to hear one that made a plea for suffering poor children—that we find some way of serving them. What has all this done for us? It has debased our work, tainted and thwarted our humanity, and degraded our professional ideals.

There has been much loose talk flying around from the clamerers for higher fees. We are told that machinists and brick-layers are much better off than dentists; yet who ever heard of a dentist quitting practice to become either a machinist or a bricklayer? All such talk is twaddle. We have been told that ministers, physicians and lawyers will average higher than dentists in their incomes. That is more twaddle. *The average dentist's income is greater than the average income of any of the other professions.*

I have heard members of the grumblers' brigade talk like this: "You cannot charge a patient too much for good dental work. It means comfort, health, even life itself. Can any fee be too big?"

Now, that is a very silly argument. The grocer might just as well argue that he could not charge too much for his flour and potatoes since they meant life itself to his customers. But, even if the argument were true in very fact, do you think it an honorable thing for professional men to put on the screws so tight that they extract the very last possible dollar from their patients? That is the principle the highwayman works on, but it doesn't seem a very high professional ideal, does it?

We cannot deny that the improvements in the practice of dentistry during the last generation have all tended toward making dental work more expensive to our patients. This is all right for those who are prosperous, but we should think of the poorer classes, the ones whom we are now educating in the care of the mouth. If we cannot supply the demand we create, had we not better leave them in darkness? Is it not useless cruelty to educate them to the urgent need of dental work and then deny it to them on account of the expense?

We ridicule so-called quacks for extracting teeth for twenty-five cents, and for making a rubber plate for five dollars; but I tell you many a poor man and many a poor man's family has had cause to bless the so-called quack office. It has enabled him to have dental work done, it has made his children comfortable and healthy, yet left him his self respect. He has not been a subject of charity.

I am going to make a dogmatic statement here that I think is worth remembering. In all the long list of dental operations for saving or restoring teeth, the one that is doing the most good to suffering humanity, and the one that is making the most money for dentists today, is the one dollar amalgam filling. It is a blessing to mankind and a greater blessing to childhood. And if we could only discover a way by which we could put in a good filling in a first permanent molar for fifty cents, we would double the amount of good we are doing and we would make more money ourselves. It will be done some day. Some day the masses will be served well and economically. We don't know all of dentistry yet. We are only children that have the biggest part of our growth to come. Some day there will be a dozen dentists to every physician.

Dental practice today is very complex. To make our service better we need to simplify. Complexity may bring beautiful results in an artistic sense, but it takes us ever further and further away from our professional ideal of serving humanity. To make our work serve mankind—all mankind— it must be simplified.

Here is something to think about: The greatest geniuses of the world and the greatest benefactors of the world are not those men who make things so expensive that only the rich can afford them, but rather are they those men who have made things so cheap that all may share in their blessings. A man like Edison does not think it beneath him to put in years and years studying how to cheapen his product. Need we be ashamed of doing the same thing in our humanitarian effort to bring the blessings of dentistry into every home in the land? I think not. In fact I know not. Yet, did you ever in your life hear a man in a dental association meeting take pains to tell you how you could do an operation cheaper for your poor patients? I confess I never did. Our efforts have all been to boost fees, to introduce expensive operations; and I for one think it is a record of which we, as a profession, should not be proud.

If it were known just how many times dentists, influenced solely by the fee, have put on gold crowns or placed gold inlays where an amalgam filling would have done as well or better, we would hang our heads in shame.

And now, in conclusion, there are just a few more words to say. I think it would be well for us orthodox dentists and members of associations to forget for awhile our orthodoxy and look at these great questions from the other side. The men who advertise and the men who cut fees are anathema to us today. Are we sure that we are right in always treating them as criminals, unworthy members of our profession? Granted that the bad taste and conceit they often show are most repugnant to our sense of professional dignity; but are they all bad? Aren't they after all, working for the somehow good? Isn't there something to be said in favor of the use of the public press and in favor of cheap dentistry? Shouldn't we contrive some way by which we can help the poor man and his poor children? Do we know it all? Have we nothing more to learn?

Let me repeat what that great American said: "By orthodox I mean a man who has quit growing, not simply in religion but in everything else; whenever a man is done, he is orthodox; whenever he thinks he has found out all, he is orthodox; whenever he becomes a drag on the swift car of progress, he is orthodox."

That great American was Robert G. Ingersol.

DISCUSSION

Dr. W. G. Downs, Evansville: When I was called upon to open the discussion of Dr. Sexton's paper, I rather hesitated, then remembering his thoroughness, I knew he would leave little for me to say; so I accepted, and I am not disappointed, for with his usual good sense, he has thought out some of the problems that have perplexed me and has presented them in a clear and concise manner. With many of his points I heartily agree; with a few I wish to take issue.

I agree fully with his contention that it is not well to be too hidebound, too docile in our acceptance of the rules laid down by our professional Madam Grundy; neither can we afford to go to the other extreme and each of us be a law wholly unto himself. It is as true in "our" profession as in any other line of work that "In union there is strength."

As I understand it, Dr. Sexton is using the terms "orthodox" and "ethical" interchangeably; yet according to our own accepted code, surely we are given freedom enough to be original in theory and practice without ceasing to be ethical, for that code, as I understand it, is the Golden Rule and the man who practices the Golden Rule from day to day, is bound to grow bigger, better and broader all the time.

It is very true what *was* good enough yesterday is not good enough today, and what is good enough today, will not be good enough for tomorrow; but I believe that our Golden Rule will keep pace with *every* day and will help us to greater professional unity.

In this discussion a great deal depends on just what Dr. Sexton means by use of the press. It is a large subject, not easily covered. Personally I have always been in favor of using the press for educating the public to a knowledge of their dental needs. Am strongly opposed to some of the boiler-plate methods now in vogue, but would favor a press committee composed of thinking men in the profession living in the community served by their local papers, such committee to furnish these papers from time to time with articles tending to educate the general public to a knowledge of the absolute need for the care of the mouth and teeth, and "*why*;" and I would not think this un-orthodox in the least.

Judging from our own daily papers, as well as those from other cities, I cannot see that advertising methods or morals have radically changed. I have before me now, at the time of writing, the "New Orleans *Picayune*" of 1846, and on comparison, can see very little difference in the dental advertisement of then and now, as they made much the same claims then as they do today, and had practically the same testimonials.

Dr. Sexton seems to be quite radical on the subject of fees, as he uses the two extremes to illustrate his point. I know we have professional pirates who would use the X-Ray on their patients' pockets to be sure of charging the limit, but believe they are rare. Then we have the all-too-numerous practitioner, who like the pawn-broker will say, "If you will not take it for a dollar, why take it for 75 cents." We must also try to educate *him* to right and reasonable methods. Just here the question comes to me: "Can there be such a thing as popular-priced dentistry?" Do you ever hear of a popular-priced surgeon in the medical profession? Are we not as necessary to the public as the practitioner of medicine?

Newer methods are not always better methods, but most of the modern equipment does enable us to do more intense and better dentistry; but I agree it is also, for that reason, more expensive dentistry than we have done in the past, and of course the public has to pay its share of the increase, as I know of no dentist who can afford to donate that continually increasing cost to his patients.

Dr. Sexton makes a plea for the dollar amalgam filling. I believe that it is almost a filling of the past, for who with a modern equipment can give the time, practice asepsis, make proper contact, contour, carve and polish amalgam fillings for one dollar?

I believe that most of us here are practicing dentistry primarily for a living and I cannot see, neither do I hear of many of my dentist friends that are bloated with wealth. Charity begins at home and each man's duty, whatever his business, is to care for the needs of his own family first, and if we comply with Dr. Sexton's suggestion of reducing our prices to the level of the dollar amalgam filling, how many would continue to operate a modern, successful office?

Dr. Sexton tells us of the conditions in his home town; we might retort by telling him of what we have done to remedy similar conditions here, of how for four years the members of our local society made absolutely free school inspection and for two years have conducted an equally free dental clinic. Happily our administration sees and appreciates our efforts to benefit the poor children of the city, and has made provision to take over and continue our work.

Judging from these things, I fear Dr. Sexton's associates are more grasping than we down here in the south, where if the patient hasn't the price to pay for a proper operation, we have been in the habit of doing the best we could for them and charging it to charity.

Dr. S. F. Bosler, Rockport: It seems to me that the paper just read is of great and vital importance, not only to this association but to all the dental associations in existence. I agree with almost everything that Dr. Sexton has said, and I am sure that it went home with every dentist here. This is a paper upon which no comment can be made except that of approbation, and it does not demand discussion, it demands compliments.

There is a spirit of commercialism today in the dental profession over the country, and it is growing at an alarming rate. Notwithstanding the claim made by Dr. Sexton that the newspaper business has developed a conscience, we still see advertisements by dentists claiming anything and everything of painless methods, all their own invention; "three dollar sets of teeth, guaranteed to eat corn off the cob."

When I took up dentistry thirty-six years ago, one never saw or heard of such flagrant advertising methods; and in fact one never saw any thing more than a modest card, giving location of office and the street. My membership in the Indiana Dental Association dates back to 1883; and up to 1915, I have missed or failed to attend but six state meetings; and up to about three or four years ago fees never were discussed at dental meetings. I think that it is wrong to ever mention fees at the meetings, for the reason that it makes the young dentist just from college think that he must get rich as soon as possible.

Dr. Sexton said we turned over the press to the quack, which is perhaps true. Why is it that there are so many unscrupulous advertisers flourishing today? There is a cause for it. I will take my town and county for a criterion; in a space of about twenty years there were ten young men who took up dentistry, and of that number four are rank advertisers, a disgrace to the dental profession, and poor missionaries to teach people oral hygiene and bring them out of darkness.

I agree again with Dr. Sexton when he speaks of advertising being justifiable. Years ago we dentists went through the country, visiting the people in their homes, and explained to them the necessity of caring for the teeth. Of instruction of the right sort we can all approve. I think his suggestion a very good one that it should be done through the press; I will say under the supervision of a committee empowered by the profession behind it; then we may hope to educate the public in oral hygiene in an intelligent way, in order that the public may be benefited and the profession as well.

NOVOCAIN*

BY H. F. KOONTZ, D.D.S., PITTSBURGH, PA.

THE MOST RECENT PROGRESS in dentistry and that which will work the greatest step forward to my mind is anesthesia. It is lamentably true that more than two-thirds of necessary dentistry is caused by neglect through fear. Eliminate fear and pain and everyone would visit the dentist frequently and with pleasure, and isn't it true that cavities encroaching upon the pulp with its trend of putrescent pulps, abscesses, focal infections, heart lesions, arthritis malaise and all the varied concomitant results would be nil? Picture your best patient who comes in smiling, wants his teeth cleaned, with a probably small cavity to fill, and compare him with the poor unfortunate one with seventeen cavities four of which show pulp exposure, and three already putrescent teeth, what a long tiresome siege for both, with an uncertain prognosis as to proper canal technic and subsequent focal infection, and tell me whether or not you have the conscience to continue to grind and cut sensitive cavities in your patient's mouth, having them come to you only through necessity, for relief from pain.

Gentlemen, am I right?

Forty thousand dentists—one hundred million people to take care of. Think of it! We could not begin to do the necessary prophylaxis alone. Seems to me, to reiterate, that our line of attack must be through fearless, frequent attention to the mouth and teeth by our patients.

A small percentage of the dentists have been and are endeavoring to accomplish this by means of anesthesia or analgesia produced by nitrous oxid, somoform and some other agents, or by blocking the nerve supply to the field of operation by conductive or infiltration anesthesia. I am an advocate of both methods, but think, however, that the latter more nearly approaches the ideal, using as the agent novocain.

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*Read before the Lake Erie Dental Society, May 1916.

Novocain is a synthetic preparation, and possesses the same anesthetic characteristics as cocain with seven times less toxicity, can be sterilized by boiling without detriment to its anesthetic properties, which is not possible with cocain as boiling destroys its alkaloids.

Length of anesthesia is obtained by the addition of synthetic suprarenin, which also is not affected by boiling, and the length of duration is relative to the amount of suprarenin used.

In order to introduce novocain-suprarenin into the tissues with safety, a menstrum must be added to it that will enter them without causing irritation or soreness. We are all aware of the normal salt fluid that is present in the body, and would therefore conclude that a solution conforming with this and carrying novocain would be ideal or isotonic. If it possessed a greater proportion of salts it would upon entering the tissues increase the salts in the cell and produce a tissue change, or if less, absorb some of the salts from the cell and likewise produce a change, all of which would be manifested in localized pain, soreness and discomfort.

For dental purposes a solution not higher than two per cent. novocain and from two to nine one-hundred thousandths of a gram of suprarenin to one cubic centimeter of solution is the dosage.

The Farbwerke-Hoechst Company make tablets designated as E, T and F, containing novocain and suprarenin in a definite proportion; one E or T to one c.c. of normal salt making a two per cent. solution, or one E or T and one F to three and one-half c. c. makes a like solution, varying in suprarenin. The same company makes a Ringer or salt solution, one tablet to ten c.c. of distilled water making a normal salt solution.

The F tablets contain no suprarenin and are combined with E or T for short operations; but for appendectomies, extractions and extensive cavity preparations the E's and T's are indicated.

Instrumentarium:

Two Fischer syringes, one with short and one with long needle.

Two dissolving cups, three and ten c.c.

One double-corked, four or six ounce bottle for keeping Ringer solution stock.

Glass jar containing alcohol to keep syringes and small dissolving cup in.

E, T and F novocain and Ringer tablets.

Campho Phenique.

Aconite and iodin five per cent. solution.

Tooth-picks for swabs.

One-half dozen one and five-eighths inch Schimmel needles.

One-half dozen one-inch Schimmel needles.

Anesthesia consists of two kinds; Conductive and Infiltration.

Conductive anesthesia consists of blocking the nerve supply to a certain part of the maxilla or mandible by depositing the solution in the main trunk of the nerve at some point along its course.

Your familiarity with the nerve supply of the maxilla as far as the teeth are concerned, would indicate a blocking of the infraorbital branch after it passes out of the infraorbital foramen, to anesthetize the central lateral and cuspids and the superior maxillary branch; by passing the needle under the Zygomatic process of the malar bone going upward, backward and inward until you reached the zygomatic space, and depositing 2 c.c. of solution, you would catch the bicuspids and molars.

The nerve supply of the teeth of the mandible would be blocked by depositing the solution in the ptergo mandibular space, or at the points where the inferior dental nerve enters the foramen in the mandible. The technic would be to palpate the retro-molar space, just back of the third molar, using index finger to locate internal and external oblique lines. Place tip of finger in the space with finger-nail slightly over internal oblique line. Swab tissue with campho-phenique, then sterilize with 5 per cent. iodin and aconite solution, area and finger-nail tip. Insert needle that has not been contaminated in any way since being filled with sterilized novocain solution, with bevel on needle towards the bone, one c.c. above line of teeth. Carry it back about the distance your judgment would suggest the foramen to be, or about two-thirds the length of needle; deposit two c.c. solution.

Indicators of anesthesia: Tingling, numbness, sensation of swelling, woody feeling of teeth in their sockets.

Try cavity with excavator, then with bur, cutting slowly so as not to heat the tooth and destroy pulp, and proceed as desensitization increases. Always cut from pulp area outward to prevent exposure.

The infiltration method consists in inserting the one-inch needle over the root of tooth midway between gum line and apex, going under the periosteum until opposite the apex, and deposit from one-quarter to one c. c. of solution, being careful not to balloon the tissues, as the anesthesia is obtained by getting the absorption of the solution through the canaliculi of the bone to the nerve under the periosteum, and the smallest amount of solution (sometimes three minims will do it), is all that is necessary, if the technic is correct. Infiltration anesthesia can be used on ten anterior teeth of upper jaw and centrals and laterals in lower jaw successfully; the others are more or less doubtful as to results.

In conclusion, let me add a few helps:

1. Remove syringe from alcohol, wash out with water that has just been boiled and fill and wrap in sterilized napkin. I use a cotton roll one and one-half inches long, wet with alcohol, to insert needle in, and after I have everything ready I pick up my syringe in hand, remove the cotton roll and insert needle in tissue. Then I am sure it is clean.

2. Always be sure the solution is clear and white. Do not use if it it has the least discoloration. If it stands a short time it turns pink from

change in the suprarenin and is toxic. It is a very powerful drug in minute amounts and its toxicity is in proportion to its powerfulness.

3. After you have palpated your area and located your point of injection, swab tissues and finger tips, inject immediately so as not to carry infection along with the needle from saliva etc.

4. Add twelve c. c. instead of ten c. c. of distilled water to one Ringer tablet and when you boil it it will be about normal.

5. Do not use any discolored tablets.

6. Get a skull and study it. You will be repaid in results twenty fold.

7. Get "Thoma's Oral Anesthesia" and read it. It is invaluable.

DISCUSSION

Dr. C. B. Cleland, Erie: I feel certain that I am voicing the sentiment of every one present this afternoon, when I say that I have enjoyed the paper read by Dr. Koontz, and have been greatly benefited.

There are a few points in the paper I wish to emphasize.

We agree with Dr. Koontz, that a large number of people neglect their teeth because of the fear of pain, and in many instances they are not to be blamed. At the present time it is beyond understanding how a man in our profession can have the audacity to compel his patient to undergo the pain and nervous strain of a sensitive cavity preparation, when there are various methods of banishing that pain, and gentlemen, these methods are not secret; every man can avail himself of them.

It seems to me, that it is up to every man to adopt some method (which he finds successful in his hands), to alleviate pain, and in time we will overcome the patients' fear of the dental chair.

The essayist's portrayal of the preparation and properties of the novocain solution is very thorough. I wish to emphasize, however, the fact that care must be taken in regulating the percentage of suprarenin, especially in the very young, the aged and anemic, perhaps not because of any real danger, but to prevent symptoms which may alarm the patient and cause fear, the very thing we are striving to abolish.

The essayist has given us a very complete instrumentarium and everything mentioned is essential. There are one or two suggestions which might be considered under this head:

(1) The container for the Ringer solution is better if made of a non-alkaline glass, because traces of alkali are dissolved from the ordinary glass container, which will in time tend to unbalance the injecting solution.

(2) I have had some trouble with the syringe rusting when immersed in alcohol, but found that a solution of 70 parts alcohol and 30 parts glycerin gave excellent results.

(3) I am of the opinion that every man using novocain for conductive or infiltration anesthesia, should be absolutely certain of the sterility of the distilled water used in making the Ringer solution. The average commercial distilled water from the drug store is not safe. If you are not sure better make yourself a little still, they are not expensive, and then you know what to expect.

The essayist's discourse on anesthesia and the technic for obtaining the same is excellent, and if followed one would rarely have a failure.

Just let me emphasize two more points before I sit down:

(1) Get a skull, study it, know your anatomy.

(2) Get Thoma's Oral Anesthesia, and Local Anesthesia in Dentistry by Fischer and Riethemuller. Then study them both.

Dr. J. A. Rupert: It is with pleasure that I take a part in the discussion of this excellent paper, and I also want to express my appreciation of the fact that the essayist placed in my hands a copy of the paper several days ago, so that I have had the privilige of reading it and becoming familiar with the thought expressed before coming to the meeting. Too many essayists do not give those appointed to discuss their papers this privilege.

He truly has said that two-thirds of the necessary dentistry is caused by neglect through fear. Eliminate fear and we will have less loss of pulps and all the resulting ills which follow such loss.

I have used high pressure anesthesia ever since it was given to the profession until a better method was presented and that better method is infiltration and conductive anesthesia.

In my hands I do not mean to say there are no failures with this method, but it is true that the range of usefulness of novocain is greater than with any other method I have ever used, and the percentage of failures, I believe to be less than with any other method. It has been my experience however, that in the case of the mandibular injection the anesthesia is not so profound in the third molar, often when the second molar is thoroughly anesthetized the third molar is still sensitive. Thoma explains this as possibly owing to the fact that fibers which supply this tooth lie nearer the center of the nerve trunk, hence not as readily reached by the novocain and as possibly being due to too strong solutions of suparenin, which by its astringent action prevents complete absorption; nevertheless it is true that success in this region is less frequent than in other areas.

The essayist spoke of anesthetizing the molars and bicuspids by the zygomatic injection. This may be possible, but in my opinion rarely can it be done because the bicuspids receive branches from the anterior superior dental. These teeth are more easily reached by infiltration.

The author spoke of the care that must be used in sterilizing the solution, the instruments and the field of operation. This can not be too strongly emphasized. Every thing must be sterile. Take no chances whatever. You may think that there is a lot of silly notions in regard to sterilization in a general way, but you will only court trouble if you take any liberties in conductive anesthesia.

Again I thank the essayist for the very able paper and for the privilege of having been able to read it carefully before today.

Northern Indiana Dental Society

The Northern Indiana Dental Society will hold its Twenty-eighth Annual Meeting in Kokomo, Indiana, October 12, 13, 1916.

The meeting bids fair to be the largest meeting ever held in northern Indiana.

The papers to be presented are of vital interest to every dentist of the State, and are subjects never before presented to a dental society in the state. Many good clinics are also booked for the meeting.

Respectfully,

Chas. A. Priest, *Secretary.*

By persisting in a habit of self-denial, we shall increase the inward powers of the mind, and shall produce that cheerfulness and greatness of spirit which will fit us for all good purposes; and shall not have lost pleasure, but changed it; the soul being then filled with its own intrinsic pleasures.—*Henry More.*

GOLD INLAYS FROM PRESSED METALLIC MODELS—THE ADVANTAGES OF THE INDIRECT METHOD

BY C. A. NIXON, D.D.S., VALPARAISO, INDIANA

THE OBJECT of this clinic is to show the advantages of the indirect method over the direct, reducing to the minimum the percentage of failure and increasing efficiency almost one hundred per cent.

The disadvantages of the direct method:

First: The length of time required in close contact with your patient.

Second: Your inability to see all margins of the cavity in question at all times during the production of your wax model.

Third: Your inability to properly carve to occlusion, due many times to the disadvantage at which you work, being annoyed by the tissues in contact, the tongue, cheek, the patient's tendency to close his jaws, and the saliva.

The main disadvantage is the blindness in which we work, from the time the wax cone is inserted in the cavity. These features are all overcome by the indirect method and many favorable conditions added thereto.

The direct method, if a poor cast occurs, necessitates calling your patient back to your office, an extra appointed time must be reserved and the same annoying procedure gone through again, with no degree of certainty that it may not occur a third time, humiliating yourself, discommoding yourself as well as your patient, and establishing in his mind some degree of doubt as to your ability.

With the indirect method, the length of the operation directly over your patient is limited to the minimum.

You have secured (taking it for granted that your cavity formation is right in every detail), a perfect impression of an individual tooth and cavity.

Then an impression of the adjoining teeth and a bite is taken with the same degree of accuracy, and your patient may be dismissed. With these three things carefully observed, you are fortified against any humiliation for yourself and disturbance of your patient.

Your cavity impression is submerged in a creamy consistency of plaster in an especially designed pressure flask and plaster allowed to set.

Your copper amalgam properly mixed, what is termed the "sloppy mix" by Harper, is divided into three sections, sufficient to fill your individual cavity impression.

First section: Use original mix.

Second section: Express approximately one-third of the surplus mercury.

Third section and last application: Express approximately two-thirds of the surplus mercury.

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*Clinic Indiana State Dental Society, 1916.

These three steps having been, with every degree of accuracy placed in their routine in the cavity impression, are ready now for the final placing A rubber disk is placed over this, the pressure plunger applied, pressed and locked, and allowed to stand until amalgamation or crystallization has thoroughly taken place. If all preceding operations have been observed, the metal model produced will be a perfect reproduction of the cavity in question. Remove from the flask any surplus, ragged edges dressed off, it may be carried to the impression and inserted in its proper position; then proceed to fill with plaster. To this model of plaster and metal tooth, adjust the bite and run up your articulated plaster models. This completed, you are ready to produce your wax model from which to cast your inlay.

Here is the first really recognized advantage of the indirect method over the direct that facilitates a greater efficiency.

A 36g. copper band is fitted to your metal model, coated with liquid vaseline, your wax softened and pushed in with thumb pressure, immediately inverted, wax downward, on rubber cushion in metal ring and forced to the depth of band in unvulcanized rubber. Remove and chill, remove your copper band, trim off surplus wax and return to your articulated plaster models and proceed to carve to articulation.

Any uncovered margins may be quickly replaced in wax with a hot spatula. Wash with oil of Cajeput, when you are satisfied that your contour, contact, and occlusal grooves are perfectly restored. Coat your inlay carefully with inlay lining, especially designed for this purpose and proceed to cast.

Return your inlay to your metal model, place in your swager and swage vigorously to place. This procedure positively assures you that your inlay will perfectly seat itself in the cavity for which it is intended, without the annoyance of binding at any point, thereby eliminating the necessity for grinding at this or that point, at which you are always guessing and many times ruin delicate margins, thereby requiring a make-over or slipping something, unfairly, over on your patient.

. If all detail has been carefully observed you will have established a higher degree of efficiency for yourself and the superlative degree of service to your patient, who trusts you implicitly.

The materials which I have found most satisfactory, and I have used almost all makes, during a year and a half of experimental work along this line, are Kerr's modeling compound and inlay wax; S. S. White's copper amalgam, and the Hatch swager.

> The one plain duty of every man is to face the future as he faces the present, regardless of what it may have in store for him, and, turning toward the light, as he sees the light, to play his part manfully as a man among men.—*Theodore Roosevelt.*

SYSTEMIC DAMAGE FROM FOCAL MOUTH INFECTION*

BY WARREN L. STAMPER, M.D., D.D.S., INDIANAPOLIS, IND.

IN VIEW OF THE PRESENT INTEREST not only among physicians and dentists, but of the public as well in the relation of mouth infections to certain systemic disease, it seems wise that we should give the matter more careful thought than it has received in the past.

Like all new ideas, this has been and is the subject of much misapprehension, especially as it relates to the attitude of the medical and dental professions toward it. It is of almost daily occurrence to have some layman visit us for the purpose of determining the relationship between his teeth and some particular disorder with which he may be afflicted.

A comparatively *small number* of infections occur through wounds of the cutaneous surface. Many of those affecting the special organs are incurred through direct or indirect contact, as those of the eye and of the genito-urinary system. They may make most serious inroads on the general health. Infections which produce the greatest number of diseases enter the system by way of the alimentary and respiratory tracts. The great importance of the well-known diseases of the nasal passages and their sinuses, the lymphoid tissues of the pharynx, including the tonsils, and the diseases of gums and teeth, is now more generally appreciated. The mouth is the harbor of many varieties of bacteria which are constantly taken into the stomach.

The importance of the teeth and assoicate parts as causative factors in the production of diseases of other and remote organs has long been recognized, but exact knowledge of the process by which this has been accomplished has not been well understood until recently. It was assumed that the principal damage sustained was by reason of improper mastication of food, and by taking into the stomach the products of putrescence from unhealthy dental organs, thereby vitiating the digestive juices and interfering with the proper performance of their functions. These ideas are not without foundation in fact, but after all they are only half truths, and have led to useless controversy rather than scientific investigation.

Advanced thought appears to hold firmly to the bacteriologic doctrine of disease, and the culture media and the microscope are constantly revealing convincing proofs of the widespread influence of these unseen elements of destruction to human life. Diseases that were involved in deepest mystery are now well understood and successfully treated.

We long have known that bacteria were specified in type and action in all diseases in which we have been able to identify a specific germ. Rosenow has done a great work in showing that changes in environment may so change bacteria that specific action varies. The appearance of the bacteria is also unlike that of the original cell. In the blood-stream, once they enter it, these various forms are selective in choosing their location, thereby developing specific local diseases.

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*Read before the Indianapolis Dental Society, 1915.

The old "idiopathic" osteomyelitis of the child we now know may follow a short time after a specific tonsilitis. Pyorrhea, tonsilitis, sinus disease, root abscesses, and pus pockets connecting with them, often are the source of acute and chronic rheumatism. The nasal sinuses and chronic mouth infections develop anaphylaxis from constant poisoning, and their results are shown in hay fever, asthma, urticaria, etc. Rosenow's work has shown that ulcerations of the stomach are conditions in which the mucosa is attacked from behind, through the blood-stream, by bacteria which live in the blood and have a selective affinity for these particular areas.

The future holds much in store for us in the way of added knowledge which can only come with study and investigation; but already we know enough to cause us to take cognizance of the relation between pathological conditions affecting two or more organs or functions in the same person. Certainly enough is known concerning infections and their mode of entrance that the infected and diseased mouth and respiratory tract must be looked on as most serious menaces.

No one seriously disputes the influence of infected tonsils, however small, upon the heart and joints, because they are known to be favorable locations for the manufacture and distribution of those elements which affect joints and heart unfavorably. No one would despute, for a moment, the statement that these lethal elements are carried to heart and joints by way of the blood-stream, and yet many of these same individuals hold up their hands and cry "Heresy!" when we assert that the same elements are generated at the root-ends of teeth and are carried in the same manner to the same parts.

The question is not as to whether teeth are more commonly the cause of general infection, but the essential point is that they are just as liable to be the primary focus as are the tonsils and sinuses; and we must bear in mind also that in many cases no doubt there may be present several foci, so that in order to effect a cure it may be necessary to attack more than one focus.

The toothsocket has a structure similar to that of the joints, and a blind abscess at the apex of a tooth may have no more significance than the lesion in the joint. While it is proper to remove the teeth that are abscessed in a case of that kind, we should not expect that that is necessarily the source of the trouble, but must look still further.

The question of the focus of infection is a matter not only for the stomatologist or the dentist but for the general practitioner and the surgeon; every branch of medicine needs to be taken into consideration to run the matter down and find the focus from which the organism gains entrance to the body.

The dentist should keep in mind the work of Rosenow in the transmutation of the streptococci at different grades of virulency; hence our ideas regarding autogenous vaccines need to be revised somewhat, in view of the fact that the vaccines administered are usually prepared from streptococci in the focus, and which may or may not be the causative organism. The instances in which good results are obtained are probably those in which the focus harbored the causative organism and the vaccine prepared from it. The instances in which poor results are obtained may be due to the fact that the vaccine does not contain the proper antigen.

Alveolar focal infection may be the dominant factor in the production of systemic disease, of which malignant endocarditis (streptococcus viridans), chronic arthritis and myositis are examples, the dominant organisms being of the streptococcus-pneumococcus group. In addition, the staphylococci, a fusiform bacillus, the bacillus ærogenes capsulatus, and various saphrophytic organisms are found. Alveolar abscesses from patients suffering from Hodgkin's disease have culturally yielded the diphtheroid bacillus, which is found also in the enlarged lymph-glands in that disease. We know also that systemic actinomycosis may arise from alveolar infection due to the ray fungus.

The result of peridental infection certainly would be more disastrous were it not for two fortunate factors of safety, the one anatomic, the other physiologic. The former is the fact that the pus usually has free drainage into the mouth. The latter factor is the establishment by the body tissues of various degrees of immunity against a continuous bacterial intoxication; for example, from bacillus coli communis. Just as the colon bacillus sometimes overpowers the individual's resistance and produces a general intoxication, a localized collection of pus, or septicemia, so may the bacterial flora of the mouth subdue the body resistance and originate an abscess, produce a general intoxication, or, entering the blood-stream, may establish a new center of growth in another region of the body.

We well may ask, Is the alveolar pus pocket the depot of origin of brain abscess, in those cases the origin of which has been unexplained, in which there has been no abrasion of the skin and no aural or mastoid infection? A purulent process in the posterior urethra, in the vagina, or in the tonsil, is considered ample source for any arthritis, neuritis, or endocarditis which may subsequently develop. Are we not then justified in considering a septic condition around the teeth as a source of various disturbed states of health, no other cause existing? Especially is this probable when the correction of the local oral condition is followed by alleviation of the general symptoms. The proof of the responsibility of oral sepsis for certain diseases of the nervous system rests on no other evidence than that just expressed; when the dental condition is corrected the manifestation of disturbance in the nervous system disappears.

Peridental infection is by no means limited to the clinic patient; it is often found in those who have taken the utmost care of the teeth. In these cases the dental work has been faulty and the real status is only revealed by a Roentgenogram of the jaw. Crowns and bridgework are peculiarly liable to have incarcerated pockets of pus.

From Billings and others we learn that systemic disease due to a focus of infection anywhere is probably hematogenous in origin. If it finally is proven that systemic infection due to a focus of infection anywhere is blood-borne, and that in case of a devitalized tooth the power of resistance is lowered, we will be driven eventually to a higher and better dentistry and incidentally to a proper consideration of the prevention of the necessity for the devitalization of teeth. In that event, probably the very best means for the preservation of teeth would be to cut all pits and fissures in premolars and molars immediately upon erupting, and resect all roots that the Roentgenogram shows positive.

The recent great increase in our knowledge of mouth infections is due to a new technic, and while our knowledge in this field still is incomplete, the newer radiographic technic often shows us changes in the bone about the root-ends which indicate a disease process, and in many instances the radiographic shadow can be said to be characteristic of root abscess.

Dr. Henry Ulrich has said that out of one thousand devitalized teeth examined by him, over seventy per cent. showed well-defined abscesses. Other investigators have shown even higher percentages, as high as eighty-five per cent., from cultures made from blind abscesses. Such an appaling percentage of failures ought to keep every thinking man from practicing pulp devitalization and root filling except it be under the most favorable circumstances and conditions, and then only with the full knowledge and consent of the patient who has been advised of the possibilities that may occur.

When we have accepted an individual as a regular patient, we have by no means acquitted ourselves of our responsibility to that patient when we have carefully cleaned his teeth, filled the few cavities and treated the few putrescent root-canals. There still remain other and exceedingly important responsibilities.

The first effort of good surgery, once pus is known to exist, is to establish free drainage. If this cannot be accomplished in whole or in part, dependence for the patient's safety must be placed upon what is commonly spoken of as his resistance, or in other words, his physiological ability to manufacture antibodies fast enough to destroy the toxins as they are absorbed.

A careful examination of the whole mouth should be made to ascertain whether there be manifested therein the clinical picture of any constitutional disturbance which requires treatment; if so, the patient should be made acquainted with the conditions and also should be directed to the specialist for treatment.

There are many constitutional disturbances which often are indicated by mouth conditions long before the patient is aware that he is sick or in need of a physician; and to look for and recognize these conditions, predisposing constitutional state, diathesis, disturbed metabolism—call it what you please—is the most important factor in these conditions, as it is in the etiology of pyorrhea, dental caries, or any chronic oral lesion. Every case of pyogenic inflammation is a problem in which it is necessary to gauge the virulence of the organism and the resistance of the patient. The differences between local and general infection are only in degree and not in kind.

What a gigantic stride dentistry has made within the last twenty-five years! It is destined to stand at the very pinnacle of all the professions; for here we stand at the very gateway, at the very door of health, and as guardians of the preservation of joyous health in the coming generations, we will then be able to answer Dr. C. H. Mayo's much-quoted statement: "The next great step in preventive medicine must come from the dentist; are you ready to accept the responsibility?"

K. of P. Bldg.

PRESIDENT'S ADDRESS*

BY DR. VICTOR H. MCALPIN, WARREN, PA.

ONCE MORE we are assembled to worship the gods of knowledge and ability, at the fifty-third annual meeting of this society. We believe with Stevenson that we are filled with confidence because a year has come and gone and we have still preserved some rags of honor.

The Lake Erie Dental Association has been noted for its good work, and it is well to recall something of its early history that we may pay homage to our forefathers, and not neglect a just tribute to their distinguished services. Born of necessity, which is true of all concerted action that accomplishes great purposes beyond the ability of the individual, this society has made a lasting reputation through its unselfish activities in behalf of the profession.

Most of the papers and clinics in those early years were given by the members themselves. Part of the records being beautifully kept, we know some of the individual opinions brought out in vigorous discussions, as well as the ideas of the original papers, these papers being preserved by pasting the sheets of the essays upon the pages of the minute book.

The subjects treated included Nitrous Oxid Anesthesia, Uses of Arsenic, Root Canal Work, Amalgam, Poisoning from Rubber Plates, Qualities of Different Filling Golds, the Filing Away of Contact Points to prevent Decay, etc. etc. As a rule their conclusions show good thinking, viewed in the light of modern research.

They were conscientious in attending the State and National society meetings, and brought home valuable information.

In 1867 Dr. J. Taft, of the Ohio College of Dental Surgery honored the society with a lecture, and since then a number of prominent men have appeared before this body, including, in the old days, the great Marshall H. Webb. In 1883, after the death of Dr. Webb, the association donated

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*Read before the Lake Erie Dental Society, 1916.

$25.00 to add to the fund being raised for a memorial to him. Resolutions of respect were passed, stating that "language fails to express our sense of loss, but our warmest sympathy is hereby offered to his family."

With an average recorded attendance of fifteen members for the first twenty years of its existence, the good the society did was accomplished through the influence of a few strong men. They were the first in the field in the state to work for a dental law, and it took eight years of struggle to get it; the first law in Pennsylvania being passed in 1876.

A very interesting letter, dated April 28, 1873, written to the association by Dr. J. C. Gifford, of Westfield, N. Y., is worthy of quotation. It says, in part: "The state of New York, the Empire State of the Union, has a thorough organization of state and district societies by authority and under the laws of the State; Pennsylvania, the Keystone State, has her state society, both a result of the perserving efforts of committees first appointed by the Lake Erie Dental Association, and today this association exerts an influence and power for the general good of the profession, superior, I think, to any other society in the State of Pennsylvania. In fact, by force of circumstances, it has become peculiarly a Pennsylvanian institution, and although I belonged just over the line, where it had its origin, designed by the movers to be a local county society, I shall always feel a just pride in having been one of its original members."

Not only did they help to pass the state law, but in 1883, they paid an assessment of $15.00 to the state society for the work of the committee on enforcement of the dental law.

In the next year, a request was received from the Surgeon General's office of the War Department at Washington, for the published proceedings of the association, for the library in the medical department of the government.

With this brief summary, we pass over to our own times. These have brought the re-organization of the National Dental Association and the different state societies, thus making a still more efficient working force for the unselfish advancement of the profession.

It being the custom of the president each year to note the improvements and important happenings since the last meeting, an attempt will be made to record those of most consequence, knowing well that some may be overlooked.

One of the most vital events of the year was the incorporation of the Research Institute of the National association, under the laws of Ohio. This is the first institution of its kind in the world, and the dental profession justly may be proud of it. The booklet describing the work contains a picture of the new home of the institute. We were very fortunate in being able to procure these buildings, and we can feel that the work has been launched in a masterly manner.

All cannot be original investigators. The average man is not trained nor has he the energy for this kind of work. About all he can do is to keep up with the latest advances in dentistry. After he has spent all day in the office trying to make both ends meet, he finds brain-fag is no medium in which to sprout a new idea. The ever-present problem to the vast majority is one of bread-and-butter. The principle involved is that of honor, to pay our just debts, or to struggle to the best of our ability and strength to do so.

And this work of the Research Institute leads us again to the important principle of concerted action, which alone accomplishes great purposes beyond the ability of the individual. This work will become the strong right arm to help many a man who is swimming around in an ocean of ideas, trying to feel solid ground under his feet. To know that some of the brightest minds of the profession are at work upon really practical problems should inspire us to such support as our humble means will permit. The Research Institute should have the very first place in our estimation. Its reports read like classics.

The war still holds the center of the stage. It is one vast arena of experience for the dentist as well as the physician. It has given our profession a chance to show its worth, which it has not been slow to improve.

Surgeon A. M. Fauntleroy, of the United States Navy in his book "Report on the Medico-Military Aspects of the European War," says: "One of the surgical advances of the present war has been the recognition of the dentist as a necessary unit in the organization of a military hospital. This has been largely brought about by the present-day trench warfare. So valuable has this work become that every large military hospital now has its surgical dental department, which works in conjunction with the other surgical services and supplements certain procedures which are indispensable as regards bringing about a favorable result.

"But the great usefulness of a dental department to every hospital has been recognized only recently. One of the most striking features of the value of a dentist in the organization of a military hospital is shown in the results obtained by surgical co-operation with the dentists at the American Ambulance, in connection with the mutilating wounds of the face."

Surely these statements ought to be enough to convince our congressmen of the importance of the army dental legislation, which the legislative committee of the United States army has recommended to Congress.

Replies received from Congressmen Penrose, Oliver, and Miller, promised their support to this legislation. The object is to give the dental corps the same grades in the army as the medical corps. The dentist will be obliged to carry a gun if called upon in emergency.

The Columbus, Ohio, Academy of Medicine, and the St. Louis Medical Society, in February, 1916, endorsed the action of the National Dental Association in seeking such legislative enactments as will offer inducements to the better class of dentists to enter the Federal service.

Our worthy president of last year reported the new Pennsylvania State dental law, requiring a four-year college course, beginning in 1917. The dental council of Pennsylvania, which requires the Pennsylvania dental schools to demand four years of high-school work for entrance to the freshman class, no conditions permitted, has issued a ruling that no dental school will be considered reputable by the Pennsylvania council if it admits students to its freshman class with less than four years of high-school preparation.

The Pennsylvania state board has modernized its requirements in practical work, and requires the student to present much more evidence of efficiency in practical operative and prosthetic work than heretofore.

A communication from the recording secretary of the state society, Dr. L. M. Weaver, says: "No new thing as far as component societies will go into effect until after the June meeting, then only if the amendments to by-laws are adopted, which will give component societies representation direct in the dental council of the state society, prorata to membership." Dr. Weaver means a general council. There is also the supreme council, elected from the floor at the annual meeting of the state society

New York State has passed a dental law somewhat similar to that of Pennsylvania; it includes the provision for dental hygienists, who will be trained in oral prophylaxis.

No new ideas of fundamental importance were presented at the Panama-Pacific Dental Congress, but the attention of the meeting was directed toward perfecting the machinery of the new organization.

The first annual report of the Forsyth Infirmary is at hand, showing a total registration of 19,930, with operations to the number of 128,404. There is also a prospectus of the Post Graduate School of Orthodontia. Those who are interested in this institution should secure these copies.

The greatest inspiration to action is example, and the effect of the Forsyth Infirmary has borne good fruit in the city of Rochester, New York. The following is from the public press of that city of July 20th, 1915: "Announcement that George Eastman, president of the Eastman Kodak Company, is to build for the city of Rochester, at a cost of about $300,000, a free dental dispensary was made tonight at a meeting of the Rochester Dental Society. Besides paying for the erection of the building, Mr. Eastman will provide $30,000 a year for its maintenance for five years and at the end of that time will provide an endowment fund of $750,000. if the institution proves a success."

The progress of the world is controlled by a handful of great leaders, men who get at the very heart of things and feed the multitude. Within the past year such a leader has finished his great work, and although this association may not have been closely connected with this man in society affairs, yet there are a number of members who studied dentistry under his eye, and, gentlemen, it would not be out of place to give some expression of our appreciation of Dr. G. V. Black's vast services to us personally and to our profession. The scope and originality of his mind were the fruits of a divine curiosity, which is the ideal attitude of the true investigator. Such a man as this is a greater philanthropist than the man who aids the work by giving his millions.

Dr. P. B. McCullough, who was with us last year, died of pneumonia during the winter.

The unveiling of a bronze statue of the late Dr. W. D. Miller, as a tribute of the dentists of the United States to his greatness, occurred at Columbus, Ohio, on December 8, 1915.

Every year it is the president's prerogative to play the physician, examine the body, and give the best diagnosis he can with recommendations for the treatment of such infirmities as are recognized. In this work he has the healthy interest of the society at heart.

What your president believes to be the most important matter to consider this year pertains to the Research Institute of the National Dental Association. The plan that is unfolding for the financial support of this work is the most equitable that can be conceived, and should have the unanimous vote of the society. The endowment fund is to be increased by the yearly subscription of a dollar from each member of the organized profession.

The very first thing to be done is to throw our whole weight toward influencing the state society to change its by-laws, so that it may assess the component societies this extra dollar per member, for the endowment fund of the commission.

This should take the form of a resolution, to be presented to the proper officers of the state society.

Word has come that such a resolution was unanimously adopted by the Odontological Society, and the Lake Erie Association should show an eager willingness to assume its share of the maintenance.

This assessment will be levied from the dues of next year. Beyond a doubt, there is not a member of this association who does not appreciate the usefulness, as well as the absolute necessity of the Research Institute. Believing this to be true, and knowing the great need of money at the present time, to wipe out the interest and debt on the property, we ought to give something from the treasury for the building fund. If the state society pledges an amount for this fund, part of which is to be borne by the component societies, what we now pay should be deducted from the share which may fall to our lot to assume.

It is no easy task for a busy man to keep up with the literature of the profession from year to year, and therefore a committee on this line of work could do a great service, even if necessary to borrow a report from some other society. The literature committee of a number of years ago must have been born dead, for it never exhibited any signs of life, and several years afterward it was buried without a certificate.

To facilitate the election of officers, a standing committee ought to be created, which annually should present a slate for the officers, and different committees, to serve the following year. It means much toward the success of the society to have the proper men at the head of committees. It means more to get the younger men upon the list, so that they may be trained into the work from year to year, and later take the responsibility upon themselves. Too much society work is not good for any one, but if the labor is properly distributed, the burdens will be lightened. The young men must take up the work, or the association will lose its efficiency. A committee on necrology is very much needed on the list. The secretary only last year sent a bill for dues to a member who had died some time before. To save such embarrassment in the future is an easy matter. We ought to stop long enough to take a breath when a member has crossed the Great Divide, and listen to a short report of the life of the man from the chairman of the committe on necrology. The small attention given to a family at the time of death mean much more than they seem to the giver. One of our faithful members, Dr. J. A. Todd, died within the year, having joined the society in 1880.

A committee on the enforcement of the dental law should be elected to act under the direction of the state committee, in reporting names of illegal practitioners. The chairman of this committee should be a man of exceptional tact and discrimination.

The law requiring registration has resulted in a list of 3405 names for January, 1916. The annual registration has proved as in other states, to be the most efficient aid in handling illegal practitioners, as this duty is now assumed by the state of Pennsylvania, through the medium cf the Pennsylvania State Dental Examining Board, instead of the State Dental Society as formerly.

After the diagnosis, whether or not the society is willing to take the bitter pill is manifested by the way the president's address is reported. It is usually given to a committee of two, to consider and endorse certain recommendations, which seem fit for adoption at the time. Nine chances out of ten, the report does not take place, except to a small half dozen at the last business session of the convention, and then it is usually taken as a joke. Sometimes the committee does not report at all. The writer has heard many an excellent address, full of good suggestions, leaving the impression in the hearer's mind that the president had sweat blood to produce such an able effort, and what was the result? Very few suggestions ever were adopted. The address should be reported as soon as possible.

If any by-laws are to be adopted, they must be presented at a previous meeting, in order to be voted upon at the business meeting on Friday afternoon. This will give the society a chance to fill any extra committees or other positions, which may be created at the time.

Good organization means smooth sailing, and it may not be out of place to offer a few suggestions to the various standing committees.

The chairman of the program committee has accomplished solid work, as revealed by the papers and clinics on the program. He has done the seemingly impossible in dividing the arduous work of this committee, an example which should be followed every year.

The exhibit committee is one of the most important on the list, and its members should be congratulated upon the splendid result of the year's efforts. This committee should exert itself to see that the dentists show their appreciation by giving a generous share of their time to the exhibitors. The attendance at the exhibits and other information of value should be recorded in a book from year to year, to assist future committees in their work.

The membership committee should be most active during the convention, and the badges which they furnish each person upon registration, should identify the men they are after. Societies are now adopting the plan of permitting members only, members of other state societies, or special visitors, to see the clinics. As every dentist in this locality should be a member of the society, the committee ought to adopt the old familiar remark and say to those men who refuse to join, "Get the hell out of here."

The oral hygiene committee has something worth while to report. This does not happen every year. But the field of opportunity is immense, and educating the masses brings returns. It also forces us to become "better individual dentists," the slogan of the National Dental Association. Speaking of education, let us not forget that the monthly page in *Oral Hygiene* has been kept up to the same dignified standard it has assumed from the first.

All the old and new committees should meet together before the convention is over for the purpose of having the old committees instruct the new by word of mouth, as writing is hard to get at after the convention is over and you all know how much a man can tell in twenty minutes.

We may repeat—good organization means smooth sailing, but the life of the convention is centered around the great men who honor us with their presence. At this time we are fortunate enough to have such men.

We do not really know dentistry until we know the best it has to offer us. It is a mistake for any society not to associate itself in all ways possible, with the most eminent men of the profession.

Above all, therefore, let us continue to procure great men for our conventions, in order to catch their spirit. The inspiration that infects us oftentimes decides our future course.

For all these things let us be truly grateful, and in closing this address, I wish both officially and personally to thank all those who in any way contributed to the convention. Also the officers, the good men of all the committees, the editors of the page in *Oral Hygiene*, and the exhibitors, for helping to bring this meeting to a successful culmination.

It is from no sense of having done anything original that I am here addressing you this afternoon, but rather from the fact that you honor me for certain humble services which I may have performed in the past, and I wish to thank you.

The men who are busy miss half of the woe that's hunting for victims to slay; they get all the cream in this valley below, while idlers subsist on the whey; while fortune kicks others she'll give you a kiss, you'll win more applause and you'll know more of bliss, if you always keep pegging away.—*Walt Mason.*

AN OPINION ABOUT INJURIOUS EFFECTS OF MERCURY IN AMALGAM FILLINGS*

BY R. L. MCINTOSH, D.D.S., CLEVELAND, OHIO.

In 1908 I had a patient present who desired some amalgam fillings removed and gold substituted. She had been treated by a homeopath in St. Louis and he had advised the change. I could not convince her wholly, and decided to appeal to Dr. G. V. Black. Herewith, I am handling you for publication, his reply. It is interesting reading and I may add that my patient was convinced of the folly of making the change.

DR. R. L. MCINTOSH. Chicago, Ills., July 10th, 1908

Dear Doctor:

I am a little surprised at your statement that you have not heard that certain physicians regard the mercury in amalgam used in filling teeth, as objectionable. It is an old, old story. If you will make inquiry, you will find that the physician is a homeopath. Many years ago, I believe it was in the later part of the time of the Civil War, a little quarrel occurred between dentists in St. Louis regarding the use of amalgam, and very promptly a homepathic physician took the matter up, and made the contention that the mercury in the amalgam used in filling teeth had a deleterious action upon the system, and that passed into pretty much all the books of the homeopathic creed. Ever since, the homeopaths have objected to the use of amalgam as fillings, notwithstanding the wide observation of dentists that persons with amalgam fillings in their teeth, are just as healthy as any other persons.

I suppose sometimes dentists will have to do their patients the wrong of removing perfectly good amalgam fillings, to satisfy this notion, but certainly it is nothing but a notion. It is so little thought of by dentists that practically nobody writes about it or talks about it, except when they run up against it. Every year I have a number of letters regarding this matter, and I certainly think it is a shame for any dentist to be compelled to remove perfectly good amalgam fillings that are doing good service, and perhaps have been for many years, to satisfy such a whim as this, for it certainly has no basis whatever in fact.

Of course we have found amalgam fillings in teeth that were doing harm, protruding over the cavity walls about the gums, producing inflammation, inviting beginnings of caries and all of that, that had to be removed, and no dentists would object to doing this, but why remove perfectly good amalgam fillings? There is no reason for it. Now, Doctor, this is very decidedly my notion of this whole matter.

Very truly,

(Signed) DR. G. V. BLACK.

ESTABLISHING FREE MUNICIPAL DENTAL CLINICS*

BY DRS. JOHN ZUBROD AND VICTOR KNAPP

IN PRESENTING THIS SUBJECT today in the form of a table clinic, we have a larger attendance than if read on the floor of the assembly hall; then again you have no chance to discuss the paper. All this is done with a full understanding that the paper is not perfect, however the writers believe it has some merit or there would be no paper; hoping it will meet with the approval of some and that the rest of you will be charitable. The writers have nothing to sell; they are only trying to conserve the teeth of the poor school children.

There is a local society in our city. On the 4th day of March at the home of the founder, Dr. A. R. Rietz, we celebrated our 11th anniversary and 100th meeting. Perfect harmony prevails at all meetings, and at all committee meetings. If necessary, the personnel of a committee is changed for best results. Our slogan is "When everybody boosts, everybody wins."

A BRIEF HISTORY OF THE EVANSVILLE CLINIC

Our clinic was started about two years ago by a voluntary donation of $500 from the late Henry Wimberg, a retired capitalist. This donation was made to Dr. Victor Knapp. Mr. A. C. Rosencranz, another retired capitalist donated two rooms in his office building, rent, heat and light free of charge. The society elected three of its members as a clinic committee. They bought the equipment, and the clinic was opened three afternoons each week by the dentists of our society. The clinic was a success from the start and was crowded every day.

Now, while working for your wealthy patients, tell them of the Forsythe and Eastman institutions, and of the necessity of a free clinic in your city, so the teeth of the poor children can be saved. Some day one of your patients will offer to equip a clinic. After having secured the funds for the working outfit, you can secure all furniture and plumbing by a prearranged plan, of having the dentists of your society call on the merchants who are patients of theirs.

The entire outfit of the Evansville clinic was secured as stated above. The death of Mr. Wimberg took away our financial support, so plans were discussed, and when we were able to show the city authorities the good work being done one of our members called on the Mayor, and the subject of the city taking over the clinic was discussed, (we have the most progressive Mayor in the world). We were told by the Mayor to prepare our plans and he would meet the committee; all this was done diplomatically and our appeal was made on behalf of the poor school children whose parents were not able to buy dental services. After presenting our case, the Mayor promised his support, (and kept his promise) One of our members met with the city attorney, and the city attorney found a legal way for the city to accept and maintain the same.

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*Clinic before the Indiana State Dental Association, May, 1916.

We operate under the Acts of the General Assembly of the State of Indiana, Department of Health and Charities, Cities of all classes, Section 213, Board of Health and Charities. The section says in part, "The board shall have charge of all matters relating to the public health, and the enforcement of laws in relation thereto, including the charge of the city hospital and city dispensary if any there be, and all the city charities."

We operate under the above section, and we believe other cities in the state can operate under the same section. One of our members again met with the city attorney, and the following ordinance was drawn up, taken before the City Council and was unanimously passed.

Following are the rules of the Advisory Board, and the City Ordinance:

"We the undersigned Advisory Board of the Evansville Dental Dispensary recommend the following rules for the said Dispensary:

RECOMMENDATION OF PATIENTS

(See Section No. 1 of Ordinance No. 928.)

All charity patients shall be sent thereunto by the recognized Charitable Organizations of said city. Said patients to have signed cards from one of the organizations, including City Nurse, School Nurses, Board of Examining Physicians, etc.

WORK TO BE DONE FOR CHILDREN

(See Section No. 4 Ordinance No. 928.)

Fillings: Amalgam, cement, and gutta percha.
Treatment: All anterior teeth, molars to be left to judgment of Interne.
Cleaning and treating diseased condition of the mouth.
Extracting: All broken down diseased teeth and roots.

WORK TO BE DONE FOR ADULTS

As this is a clinic for children no fillings or cleaning will be done, but relief will be given to all suffering.

WORKING HOURS

(See Section No. 3 Ordinance No. 928.)

Every morning of the week from 8 A.M. to 12:00 M.

DUTIES OF ASSISTANT

(See Section No. 3 Ordinance No. 928.)

The monthly report and inventory to be submitted to Advisory Committee for verification.

All records to be kept open for examination.

ORDERING SUPPLIES

Order sheet to be made out by Interne and Assistant.

Advisory Committee to approve same, then submit same to Secretary of Board of Public Health for approval.

Supplies will then be ordered by Advisory Board.

ORDINANCE NO. 928.

An Ordinance Establishing a Dental Clinic and Dispensary in Connection therewith, Providing for the Appointment of an Interne and Assistant therefor, Defining their Duties and Fixing their Salaries and matters connected therewith.

WHEREAS, the late Henry Wimberg in his life-time gave to the Evansville Dental Society, the necessary and proper equipment for a public charity, to-wit; a free dental clinic, which equipment the said dental society has offered to transfer to the City of Evansville, as a gift; which gift said City now accepts.

WHEREAS, the public health of said City requires the establishment and maintenance of a free dental clinic and dispensary in connection therewith; and

WHEREAS, the establishment and maintenance of such free dental clinic and dispensary, has been recommended to the Common Council of said City of Evansville by the Department of Public Health and Charities of said City; and

NOW THEREFORE:

SECTION 1.—Be it ordained by the Common Council of the City of Evansville, pursuant to the recommendation aforesaid, of the Department of Public Health and Charities of said City, that a free dental clinic and dispensary be, and the same is hereby established, in said City for the treatment of all charity patients, sent thereunto by the recognized charitable organization of said City, including the Board of Children's Guardians, the Associated Charities, Salvation Army and all children from the public schools of said City, who may have not, and whose parents have not, the means with which to pay for the necessary dental examination, work, and materials.

SECTION 2—Said clinic and dispensary shall be under the immediate direction and control of the Department of the Public Health and Charities of the said City, and shall be kept open at least four hours of each week day in the year, except through the months of July and August, during which said months of July and August said dispensary shall be closed.

SECTION 3—Said clinic and dispensary shall be in charge of a competent and skilled dentist, duly licensed under the laws of the State of Indiana to practice dentistry, who shall be in attendance at said clinic and dispensary during all hours herein fixed for keeping open the same, and it shall be the duty of said Interne to keep complete records showing the names, ages and residence of all patients served at said dispensary and clinic, together with the name of the charitable institution recommending said patients for treatment, and also a brief history of the nature and character of the treatment given in each case. And said Interne shall also make to said Department of Public Health and Charities an inventory of all supplies on hand.

SECTION 4—Said Interne shall be appointed by the Mayor of said City, and said Mayor shall also appoint a lady assistant to said Interne whose duty it shall be to attend said clinic and dispensary during all hours when the same is required to be open, as herein provided for, and to render such services and assistance in connection with said clinic and dispensary as are usually performed by assistants in such cases.

SECTION 5—Said Interne shall receive a salary of seventy-five dollars ($75.00) per month, and said assistant a salary of twenty-five ($25.00) per month as full compensation for services rendered hereunder, payable in monthly installments at the close of each calendar month, for the time actually engaged in such service.

Section 6—It shall be unlawful for either said Interne or said assistant to charge or receive, or attempt to collect any remuneration, directly or indirectly, for his or her services rendered in connection with said clinic and dispensary, other than their respective salaries herein provided for; and said Interne before entering upon the discharge of his duties as such shall execute such bond payable to the City of Evansville, Indiana, in the penal sum of One Thousand Dollars ($1000.00) with surety thereon to the approval of the Mayor of said city, conditioned on the faithful performance of his duties as such Interne, and his faithful observance of the terms and provisions of this ordinance, and for the faithful carrying out of the rules and regulations of the Department of Public Health and Charities, and that he will carefully and properly care for and dispose of all supplies and other property which shall come to his hands as such interne, in accordance with the provisions of this ordinance, and such rules as may be adopted by the Department of Public Health and Charities.

Section 7—The sum of Two Hundred Dollars ($200.00) is hereby appropriated for the payment of the salaries of said Interne and said assistant and the further sum of fifty dollars ($50.00) for the purchase of supplies from this date to the first Monday in January 1916, out of the general fund of said city not otherwise appropriated.

Section 8—And the Comptroller of said City is hereby authorized and directed to pay the salaries of said interne and said assistant, and also to pay for supplies upon orders drawn by the Department of Public Health and Charities and duly signed by the Secretary therefor, which orders shall specify on what account each payment is made and in case of salaries the time for which said is made.

This is to certify that the foregoing ordinance was adopted by the Common Council and approved by His Honor, the Mayor, this 18th day of November, 1915.

The Mayor appointed the Interne, Dr. Brumfield, from a list of five names submitted by the Evansville Dental Society; the assistant was appointed in a like manner. The Mayor exacted and the promise was given that the Evansville Dental Society would take charge of the clinic, relieving the Secretary of the Board of Health of all detail work. An Advisory Board of five practicing dentists was appointed from a list of twelve names submitted. There is no salary attached to the board members, nor does the name of any member of the board appear on any stationery, as the entire society deserves credit. Our slogan as was said before is "When everybody boosts, everybody wins."

The appropriation by Council to the Board of Health for the City Dental Dispensary for 1916 is $1200 00, $1000.00 for salaries and $200.00 for supplies. The dental supply houses give us twenty-five per cent. discount.

The Forsythe and Eastman Institutions are monuments erected in honor of our profession, but they like our clinic were not erected in a day.

Now, go home and start another monument. If your efforts meet with success, your work will be well done, but if you fail after hard work, you too have a erected a monument, and deserve credit We are optimists not pessimists. It is not What is there in it for me, but What can I add to my profession. You will now be given a copy of our city ordinance, take it home with you, profit by our experience. In conclusion will say we are giving you a proven fact, not a theory, and the Evansville Dental Society is proud of its record. We don't want a vote of thanks, as we have complimented ourselves; and so endeth the lesson.

SYPHILIS AND ITS ORAL MANIFESTATIONS*

BY HARRY LANGDON, M.D., INDIANAPOLIS, IND.

IT WILL BE MY EFFORT to present as clearly as possible a subject of vital importance to all professions and to all classes of society. Its appeal is not only medical, but sociological as well; and the intelligent layman has his part to play in the solution of the problems presented by this ubiquitous scourge.

There is no other disease which creates the havoc of syphilis; none with a more insidious, deceptive and persistent course. There is no disease with so great a variety of manifestations nor one which ends in such utter disaster. There is no age, sex or physical condition which precludes the possibility of the ravages of syphilis, and no tissue nor organ that is immune to its attack. Syphilis is a disease which is peculiar to man and is with difficulty transmitted to animals. It is perhaps the only important disease which is truly hereditary. This phase in itself should be sufficient to arouse the energetic activities of society in this direction.

The physician alone cannot eradicate this disease, but with the rational education of the layman this object is possible of accomplishment.

According to Dr. Pusey, syphilis was introduced into Europe in 1493 by the sailors returning with Columbus. These men were infected in the West Indies, where the disease had probably existed for many years.

Previous to this time there is no record of any disease in Europe which resembles syphilis, and human bones of periods earlier than this show none of the characteristics of syphilitic bones.

Within a year the sailors who had been with Columbus had rather effectually syphilized France and Spain, so that when Charles VIII, of France started with his army of western European mercinaries for the conquest of Naples, he carried into Italy the potent factor of the epidemics which swept Europe soon afterward. After the rout of Charles' army by the Neopolitans in 1495, his soldiers returned home or sought other service throughout Europe; and we have, then, a succession of epidemics of syphilis occurring in Switzerland, Germany and France in 1495; Holland and Greece in 1496; England and Scotland in 1497, and in Hungary and Russia in 1499. From these sources it spread over the entire world and has never yet been exterminated from any country where it has gained a foothold.

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*Read before the Indiana State Dental Society, May, 1916.

The most valuable bit of knowledge gleaned from the records of the 17th century was the possibility of extragenital transmission of syphilis.

The 18th century showed the use of mercury in the treatment of syphilis. Morgagni showed the frequent occurrence of syphilis of the internal organs, and the hereditary effects of the disease were also recorded at this time.

The work of the 19th century is characterized by the development of the clinical history of syphilis. All was accomplished that could be done without definite knowledge of the specific cause of the disease.

Our advance in the knowledge of syphilis in the 20th century is noticeably spectacular. The rapid succession and the brilliancy of the discoveries of the last few years are unparalled in the history of medicine.

These events have made it possible to study syphilis and work out its problems on an accurate scientific basis.

In 1903, Metchnikoff and Roux demonstrated animal inoculation with syphilitic tissue.

In 1905, Schaudin and Hoffman achieved immortal fame by the discovery of the specific organism of syphilis—the Spirochæte Pallida.

In 1906–1907, Wassermann, Neisser and Bruck evolved and made practical the blood test for the diagnosis of syphilis, known as the Wassermann test.

In 1910, Ehrlich announced the discovery of what is at present our best and most specific treatment of syphilis—salvarsan or 606.

In 1911, Noguchi, at the Rockefeller Institute in New York, succeeded in artificially cultivating the Spirochæte Pallida. Through this he has been able to give us the Luetin test for late syphilitic conditions. Other developments have followed rapidly: the intravenous use of salvarsan and other drugs; intraspinous medication; the demonstration of the Spirochæte Pallida in the cortex of the brain in paresis, and in the spinal cord in locomotor-ataxia; also the valuable diagnostic and differential tests with the spinal fluid—particularly Langes' colloidal gold test

These discoveries have made it possible to check up the clinical work of the last century, and have simplified and made more practical the diagnosis and treatment of this disease. The Wassermann test has helped us to prove that many obscure conditions are of syphilitic origin, that many puzzling skin manifestations are due to the action of the spirochæte. It has shown us that the nervous system may become affected early in the secondary stage, instead of years later, as we used to believe.

The demonstration of the Spirochæte Pallida has enabled us to distinguish a chancre from other sores, and to establish treatment much earlier than before. Indeed, our prophylactic, diagnostic and therapeutic measures are increased a hundred fold; and still, how often are these opportunities neglected and ignored!

Clinically, syphilis divides itself into a stage of incubation, a primary, secondary and tertiary stage. The stage of incubation begins with the entrance of the spirochæte into the tissues and ends with the appearance of the chancre—approximately three to four weeks. The primary stage extends from the first appearance of the chancre until the disease becomes systemic and the eruption appears. This may be from three to eight weeks. The secondary stage is the acute stage, and begins somewhere near the end of the primary and extends rather indefinitely toward the tertiary. The tertiary stage begins as the secondary acute symptoms subside, and represents the period in which the organism is selecting a location for more or less permanent residence.

Latent syphilis is a condition in which the spirochæte remains in a quiescent state in the tissues, and may extend over a period of years.

It has been shown by experiments that the spirochæte can not enter the unbroken skin; that an abrasion is necessary. This may be microscopic in size. Once entered, the spirochæte begins to multiply, and according to McDonough, has a particular affinity for the protoplasm of the connective tissue cell. This causes a rapid proliferation of the cells, which later become fibrous tissue, thus accounting for the induration or hardened swelling which is so characteristic around the margin of a chancre.

The chancre is the initial lesion of syphilis. It will occur whenever the organism enters the body under proper conditions. This is most frequently on the genitalia, in the oral cavity, on the fingers, face or scalp. This diversity of location and the fact that the pathology of the disease is practically the same no matter where the chancre is located, should prevent us from classifying syphilis as a venereal disease. This classification is unfortunate, as a large percentage of syphilis is acquired innocently and the stigma which is naturally attached is so unjust and so sub-consciously harmful.

Clinically, syphilis runs a very characteristic course, and yet there are great variations in the intensity, duration and appearance of the symptoms.

Cases are frequently encountered in which the primary and secondary stages have been so mild as to be overlooked, or in which they have been, objectively, entirely absent. A chancre on the lip or in the mouth has frequently been mistaken for a fever blister or canker sore; the secondary stage has been passed without any visible evidence of the infection, the tertiary manifestation being the first sign of trouble which sends the patient to the doctor.

There may be a coincidence of soft chancre and syphilitic chancre; the former, which ulcerates rapidly, completely obscuring the latter, so that the secondary eruption is the first symptom observed. In fact, no two cases run a parallel course throughout. This makes the diagnosis of syphilis often very difficult, and the help of the laboratory becomes a necessity.

In a typical case of syphilis, the chancre appears within the month after inoculation, usually small, red, indurated and perhaps slightly ulcerated. Lymphatic glands in the area surrounding the sore are quickly involved. The chancre has no invariable characteristic. It may run a severe or mild course and in a few weeks begins to disappear.

The secondary stage begins with an eruption in the form of reddish brown spots underneath the skin. They occur on the chest, abdomen and back, the anterior surface of the arms and legs, on the scalp and often on the face. These spots begin to fade in about two weeks, and finally take on a distinct, dull, coppery color, which may persist for several weeks. The secondary rash may also be acneform, or it may be pustular in character.

With the eruption, or preceding it, there may be fever, which may be intermittent or continuous. The intermittent type is sometimes mistaken for malaria. Varying degrees of anæmia frequently occur in this stage; the throat becomes congested and sore and the mucous patch appears. Iritis and rheumatic pains are common. Frequently the hair falls out, and always the lymphatics are involved.

There is a great overlapping of the secondary and tertiary stages of syphilis, so that it is impossible to say definitely of certain symptoms, that these are secondary and these are tertiary.

Prehaps the most characteristic tertiary lesions are the late syphilides and the gumma. The former is an ulcerative process, which has a tendency to destroy the deeper layers of the skin, leaving scars. These lesions appear in a great variety of forms, occasionally covering the entire body. The gumma will be discussed later.

Syphilis of the nervous system manifests itself most frequently in three forms—cerebro-spinal syphilis; tabesdorsalis, (or locomotor-ataxia,) and paresis. These conditions usually appear late and are the most difficult to treat.

The oral cavity presents an exceptionally fine field for syphilitic infection. There is an extensive mucous surface, and in some places this protecting membrane is very thin. There is always moisture present, which is favorable to the life of the spirochæte. There are the roughened papillary surfaces of the tongue in the crevices of which the organism may be held. There is always more or less mechanical irritation during mastication, which is probably never accomplished without the production of abrasions sufficient for the entrance of the spirochæte.

The modes of infection are various—kissing being one of the most frequent. Knives, forks, spoons, cups and glasses when not properly cleansed; the infected wet nurse and the practice of breast drawing; the exchange of chewing gum between children or from mother to child; the common use of pipes or cigars, or as has been recorded, the family tooth brush; incidentally, from unsterilized dental instruments.

Chancres, or primary sores of the oral cavity, appear most frequently upon the lips, preferably the lower lip. This is logical, as the lower lip protrudes more, is more mobile and comes more intimately in contact with eating and drinking utensils, and is more exposed in kissing.

Chancres also occur on the tip, dorsum or sides of the tongue, upon the tonsils or in the pharynx. Chancres of the oral cavity show the same indurated, hard base which is so characteristic of the chancre in any location. Here, however, the sore presents a more sinister appearance because of the ulceration which is almost always present, due to the action of bacteria always found in great numbers, and to the softening of the epithelium. The sore is usually round or oval, may be slightly elevated and is sharply outlined. These sores are not painful, and there is always a characteristic, rapid, bilateral enlargement of the lymph glands.

This is one of the most constant diagnostic features, as with the ulcer of stomatitis there is rarely any lymphatic involvement, and in cancer the lymph glands are not affected so rapidly. The best mode of differential diagnosis of chancre, however, is the microscope.

The most frequent and most infectious manifestation of syphilis seen in the mouth is the mucous patch. This belongs to the secondary stage of the disease and corresponds to the erythematous eruption seen on the skin. The mucous patch may appear on the lip, tongue, tonsil or buccal surface; in fact, at any point on the mucous membrane. It occurs with greatest frequency on the lower lip, is usually multiple, irregularly round, definitely outlined and very slightly elevated. There is neither pain nor soreness, unless in a position where irritated by the teeth, and there is no inflammatory zone surrounding it. It is white or grayish white in color, and if the surface is removed, leaves a smooth red base. The mucous patch is extremely infectious. Next to the lip, the tonsils and buccal surfaces are most frequently the seat of mucous patches, the tongue being perhaps the least frequent. In all of these locations, the appearance of this lesion is practically the same.

The gumma is the characteristic lesion of tertiary syphilis. It is perhaps less infectious than the mucous patch or chancre, but the spirochæte is found in gummatous tissue, especially around the margin; so it is well for the dentist to be cautious in this stage, as well as in the others.

The gumma appears in any part of the oral cavity. It is a hard, inflamed, vascular tumor, varying in size and very prone to ulcerate. It may be superficial or deep, the latter being usually larger and usually present a longer time before it breaks down. Scar tissue always is found to replace the normal tissue destroyed by ulceration. When gummata occur on the hard palate the bone usually is involved and very rapid necrosis follows. This lesion, which in most cases is multiple, does immense damage by its destructive processes; but fortunately responds readily to anti-syphilitic treatment.

Another tertiary syphilitic lesion which was first described by Fournier, is the tertiary plaque, or sclerosing glossitis. This is a red, disk-shaped induration of varying size which breaks down, forming irregular fissures or deep ulcers upon the tongue. These heal, leaving thick, hard, white, smooth plaques.

The so-called para-syphilitic phase of oral syphilis is represented best by a condition known as leucoplakia. This condition occurs on any part of the oral mucous membrane, and clinically is unlike any other affection of the mouth—large, milk white or pearly white, hard, smooth patches, sometimes elevated, sometimes not. These may be oultined sharply or may disappear gradually in the surrounding membrane, which may or may not show an irritation. This condition is seen in pipe smokers, tobacco chewers or persons who use strong alcoholics, highly seasoned or exceedingly hot foods, or where there are bad teeth or poor dentistry. These may be the exciting causes, but in the majority of cases an underlying syphilitic condition may be discovered. It is also a common observation that cancer develops in these patches. Whether syphilis is the causative factor or not—(and opinion is here divided), it so frequently is associated with this disease that it should demand the close observation of dentists and physicians wherever it is encountered in their work. The patient frequently is not aware of its existence, as it is painless and not accompanied by any general systemic conditions. The intimate association of syphilis and cancer with leucoplakia make it of paramount importance to both patient and dentist.

The principal hereditary manifestation of syphilis of the oral cavity is seen in Hutchinsons' teeth. This is most marked in the upper central incisors. The incisal edge is notched and the crown is more or less globular in shape and usually discolored. These teeth are usually soft, calcification having been more or less imperfect. If syphilis is the etiological factor in this condition, it is probably not due to the direct action of the spirochæte, but through a nutritional perversion, which causes a defective formation. The fact that this type of teeth occurs also in rachitis, creates some doubt as to its syphilitic origin.

The foregoing conditions are a few, but the most important, of the oral manifestations of syphilis. Canker sores, fever blisters, eczema of the tongue, ichthyosis, tuberculosis and malignancy are conditions which must be differentiated from syphilis.

The purpose of this paper is not to make a differential diagnosis of these conditions; but rather to call your attention to some of the every-day conditions that present in the mouths of many of your patients, and to make an earnest appeal to you to be more careful and more observant of all conditions that exist in the oral cavity.

There are other things in the mouth than two rows of teeth.

This subject should be considered from two stand-points; that of the dentist and that of the patient. There is no class of professional men who are more subjected to accidental infection than the dentist. For his own sake and the sake of his family he should be familiar with the dangers he encounters. From his standpoint there is no condition of the mouth which is more important than syphilis. Close observation and extreme caution cannot be too urgently emphasized.

On several occasions I have called the dentist's attention to mucous patches in the mouths of patients we both were treating, to find that he had entirely overlooked them.

From the other standpoint, it is certainly of vital import to the patient to know that he has a leucoplakia, since, according to Sutton, twenty per cent. of the epitheliomas of the tongue arises from leucoplakia patches.

It is also frequently the case, that the mucous patch is the first manifestation of syphilis that is seen; and since it usually is painless, the dentist may be the first to discover it.

By close observation and thorough investigation, both dentist and patient may be saved untold suffering.

The microscope, the Wassermann test and other diagnostic means are easily accessible today; and the dentist or doctor who ignores or overlooks these danger signals so often shown in the oral cavity certainly is criminally negligent.

References: Pusey, Gilmer, Buckley, Blair.

Dr. Gershwiler, M.D., Indianapolis: Dr. Langdon said he would leave something for me to discuss, but he has covered the subject so thoroughly that there is but little more to say. This subject of syphilis to me has become the more interesting as the years have gone by. The progress that has been made in the diagnosis and treatment especially has been so rapid and so much greater than ever made before, that it is interesting to any one who has kept in touch with it.

There are several aspects I would like to touch upon. The first I think is definitely settled, that is, the origin of syphilis. I do not believe there is any queston in the minds of the authorities now as to where it originated. It originated in the western hemisphere. It was taken over by the sailors of Columbus and it spread over Europe from Spain after that. We do not find any syphilitic bones in the mummies. There is only one bone in France that is claimed to have been syphilitic, and it might be some other condition of the osseous substance that produced it. The kings and higher grades of men who lived in Europe in years previous were the same as those of today, and if there was syphilis existing at that time, they would have gotten it, and the reason they did not get it is that it was not there.

There is aother side of syphilis that I would like to speak about which the doctor did not go into fully, the social side, the dissemination of syphilis. Where do you find it? You are likely to find it in every home in the state of Indiana. We do not treat syphilis from the worst part of the city of Indianapolis only. The people in the better sections of Indianapolis are practically as much exposed as in the poorer. You will find syphilis in all classes of society. What is the percentage of syphilis in the state of Indiana? We haven't any accurate data in regard to that, because we cannot get it. A few years ago the authorities of the city tried to keep a record of the cases by having the physicians report them, not the patient's name or vocation, but we were asked to give age, sex and color. We kept that up for probably six months, and the record grew so great that they would have had to get another secretary or two, and so they stopped it.

The percentage of syphilis in Berlin is about 15. In New York City it is probably 15 per cent. or more. The percentage of syphilitic cases in Indiana is probably 10, and it is more in Indianapolis. Think of that! One person of every ten in this audience perhaps—we will except the dentists and doctors present—has syphilis. More than ten per cent. of the doctors and dentists have it, doubtless, because they are more exposed than others that I know of. Some of the mouths I have seen that were being treated have made me wonder why nearly every dentist is not an innocent victim. You can begin to grasp what you are meeting when you go into the mouths of those cases.

Let us take up, for a moment, the innocent infections. Of course all dentists come in that class. You are exposed in your work. The doctors are in the same class. We have the hereditary syphilitic. How is the child infected? If the father had had the infection four or five years before, the mother would not be infected by contact. That is the old rule that Keyes worked out many years ago. The male syphilitic may marry without danger to himself of transmitting the disease to his wife through contact, but we have the offspring who becomes infected frequently, and by that means infects the mother; the mother and the child are the innocent victims. Usually the first three or four die before birth; maybe all die. The next may live a few weeks or months or years, and then die; and then maybe we have two or three which grow to manhood more or less deformed from the ancestor. The father does not suffer, and probably does not know. There is no reason why he should know about it, or whether he will contaminate any one or not.

Suppose we take up the infectious stages of syphilis, the ones to which you are exposed you are not going to recognize; and we do not recognize as many primary sores, as I have seen so many in a year, and Dr. Langdon sees so many, we probably do not recognize five out of ten that we can say definitely are primary sores, innocent infections and otherwise. I have seen dozens on the fingers of doctors in the last few years, not one of which I could say definitely was such. I have seen them on the tongue and on the lips. They are more easily recognized on the lips, but we do not have them always, and if you expect to find these primary sores characteristic, you will be mistaken. You won't always have the hard sores, you won't always have the typical ivory coloring around it, indurated; so, because it does not show up the characteristics, you cannot say that it is or is not a syphilitic sore or infectious.

You are exposed to infection from, say, the sixth week of the duration of the disease. Primary infection will take place from ten days to six weeks following exposure. Two weeks from the time, from the appearance of the primary sore, you will have a plus Wasserman, you will have the nearest lymphatic gland enlarged. If you have the infection on the tongue or around the mouth, you will have the submaxillary lymphatic first enlarged, and then the general lymphatic system.

As soon as the lymphatic system becomes enlarged, you will be able frequently to demonstrate spirochæta in the tonsil. From that time you are exposed, of course, in handling that patient; before the patient knows or suspects he is syphilitic, you are exposed. That exposure will continue until the patient has been treated, or for several months or a year perhaps. The most dangerous time is of course the time that the spirochæte can be found in the mouth, in the mucous patches, not in the leucoplakia, not in the gumma tongue or palate. They can be found in the gumma all right, but you do not find them loose in the mouth or coming in contact. You can split the gumma open and find them there, but as a rule you do not find them in the mouth. So during the stage of tertiary syphilitic conditions in the mouth you need not have any fear. I would not be afraid to work about a patient's mouth with syphilitic gumma, but I do fear to work around a syphilitic mouth with secondary rupture, and when I find I have done so, I of course always carefully sterilize my hands. The doctor has spoken of the secondary lesions, and I only want to emphasize the dangers that you are exposed to during these secondary lesions. You need not mind the tertiary, because they are not, as I say, infectious. The tertiary lesions are important to you from the fact that the patient does not know what the condition is. Suppose the patient comes with leucoplakia. Leucoplakia is not necessarily syphilis, but I never have seen one whose blood was not positive. That does not mean much, because I haven't seen all there have been. But if a patient has leucoplakia, he is exposed to two different things, he is either syphilitic or exposed to the possibility of the cancerous condition which practically always occurs. I believe you should insist on that patient having himself examined as to that condition. If it is syphilis, he should be treated; if he is not syphilitic, he should know what might happen, of course.

It is not necessary for me to talk about necrosis of the palate. There is a condition in which we might be able to distinguish between the gumma of the tongue and the epithelioma. The gumma of the tongue are practically nearly always near the center of the tongue. The gumma begins below, deep, continuously enlarging until it gets to the surface, but as a rule it breaks down, making an ulcer. The epithelioma as a rule begins the other way and goes down. The differential diagnosis is practically this: The cancer of the tongue usually comes from a bad tooth, the tongue being constantly irritated by the presence of that tooth. Moral—get all your teeth fixed. Gumma usually occur in the center. The age of the patient has quite a good deal to do with that. The gumma are found in patients usually from twenty-five to thirty-five years of age; the cancer of course occurs in those who are older, because it comes later in life. With the gumma you do not have much pain; with the malignant growth you do. In the gumma the tongue is freely movable; in the malignant condition it is not.

One other thing, and that is treatment. I want to impress upon you the differences that have occurred in the treatment within the last five or six years. Erlich, whose idea was to clean up the patient with one dose of salvarsan, has now been superseded as to that. He discovered before he died that he had not been able to do it. We have cut down using salvarsan, trying to evolve a method by which we could finally clean up the patient. That has been done in a number of instances, and in some instances it has not. I have treated some cases, and if I had kept on with the methods I used two years ago, giving a dose of salvarsan and letting them rest a month or so, and then giving another dose or so, I think if those patients should live until the next Centennial of Indiana they would still have syphilis, because they were not a bit better by that method of treatment than when they began. If you get the idea that one dose of salvarsan will cure syphilis in any stage, you are mistaken. The idential treatment has not been worked out yet, even with salvarsan. We know it must be intensive. You may take 40, 50 or 60 doses of salvarsan; some take 100 and still have syphilis. It is not a bright picture for us to look at, or a bright thing for us to admit, that with mercury and salvarsan and all the modern evolutions of therapeutics, that there are some of those cases that have not been cleared up.

Another thing, you will have spinal syphilis early, I saw a case of locomotor ataxia, whose primary sore was eight months prior to that time, and the spirochæta was demonstrated in that case. He could not walk across the floor and tell whether his shoes were on or not. If he tried to feed himself, he might throw whatever he was eating over his shoulder, in eight months. Now what is necessary is not only that the blood shall be negative for months. or if it is negative you should insist on going into the spine, as the doctor has mentioned and I want to emphasize that. Early investigation of the nervous system in those cases that are being treated is necessary. In eight or ten weeks you will find your spinal fluid positive. Your salvarsan will not reach your spine in those cases. They must be treated intra-spinally, and then you have a long row to hoe; if you let them go very long. Your treatment must be intensive from the beginning, a dose of salvarsan every week and a check kept on the blood. That is the method of the best authorities in the United States. Do not get the idea that it is a small thing, gentlemen, that you can give a few doses of salvarsan and bring about a cure, because that is not true. And do not permit any unnecessary exposures. I have a deep interest in the prevention of syphilis. I do not want anybody to get it, either innocently or otherwise, and I want you to think of those things because it is not easily cured. It is a thousand times easier not to get it by being careful and using all the methods of asepsis that we have at hand, than to cure it.

Dr. Carl D. Lucas, Indianapolis: Such a paper as the one you have just heard is difficult of discussion, especially when the respondents have but one day in which to prepare a written discussion, which is a requirement of our executive staff.

The chief issue which the writer wishes to take with Dr. Langdon, not his paper's contents, is that it is decidedly unfair and discourteous to the discussors and to the State Dental Association that his excellent paper should have been delayed in delivery until the day before the time for its presentation. It is entirely proper for all discussions to be written, for then they will be definite, to the point and have Dr. Otto King's favorite "terminal facilities."

The subject is one exceedingly well worth all the consideration which we have time to give to it. The essayist has very forcefully presented the importance of his subject to the dental and medical professions and thereby a preventive measure in our operations upon our patients.

We should remember the salient points in diagnosis of oral syphilitic lesions. The initial lesion, the chancre, usually occurs upon the lips, preferably the lower, and we must remember that about 99 per cent. of the untreated syphilitics who pass on to the tertiary stage have had lesions of the mouth, not necessarily the chancre but mucous patches upon some part or parts of the buccal mucosa. These ulcerations of the mouth, which finally also accompany tertiary syphilis, may be differentiated from tuberculous conditions by the demonstrable tubercle bacilli, the presence of histologic tubercles in the lesion and the absence of the treponema pallidum.

Hyperplasia of the lymph follicles at the base of the tongue is usually a manifestation of syphilis. This is a chronic sclerosing or fibrous replacement process.

In the primary lesion the submucosa becomes infiltrated first with small, round cells, in which epithelioid and giant cells may be found. The circulation to the surface is cut off by obliterative changes in the arteries, and ulceration or coagulation necrosis is the result.

Mucous patches and ulcers are the result of liquefaction necrosis, and occur in the mucous membrane of the cheeks, inner surface of lips, tongue, pharynx, soft palate and tonsils, also upon the mucous membranes of the anus and genital organs.

Gumma, the tertiary lesion which affects mucous membrane, which occurs in the submucosa, develops like the primary lesion or granuloma and ulcerates if not treated.

We may observe scars in the mucous membrane, which may be contracting cicatrices of previous syphilitic lesions.

The so-called Hutchinsonian teeth are not definitely considered diagnostic by the dental profession, on account of the many febrile conditions of early infancy which arrest the development of the permanent teeth. However, the true Hutchinsonian teeth, which few of us have seen, are still regarded by the medical profession as distinctly diagnostic of hereditary syphilis.

The statement which is incorporated as one entire paragraph in the paper "There are other things in the mouth than two rows of teeth," is not so edifying to the dental as it evidently is to the medical profession. The educated dentist long since has been entirely familiar with that information. The dentist is considered by the physician as a specialist in medicine whose field is limited to the oral cavity, and therefore his supposed ability is receiving due consideration and his opinion as an oral diagnostician is not to be disputed.

Dr. Howard Raper, Indianapolis: What I learned from Dr. Langdon this evening is what I already knew. Not that I remember all the data that he gave us, but I have learned just what a chancre looks like, that it might be dished out, or might not be, that it might have a red border or might not, that it might be one place or it might not be there; in other words, that there is nothing distinctive about the thing at all, nothing distinctive enough for me to know a chancre from a fever blister.

I believe we should be suspicious of any ulces or nasty-looking sores in the mouth, and we should have in our offices a bottle full of bichloride of mercury tablets, and take the percaution to sterilize our hands after we have been handling such a case. I take it for granted we do sterilize our instruments, but I sometimes doubt whether the dentist takes time to use what I believe is the best drug, bichloride of mercury, for the purpose of sterilizing his hands.

As to a further diagnosis, as your suspicion increases, I do not feel that I would be at all able to finally say that a man had syphilis or did not. I would leave that for the man whose business it is to find this thing out, and if I had such a patient I would refer him to a man skilled in the use of the microscope, and skilled in making this kind of a diagnosis, and depend upon him to further protect me and the patients who might happen to be in my care.

Dr. Langdon: (Closing). This discussion might be carried on indefinitely, as the subject is a very large one, but I will try to confine myself to a very few points. I owe Dr. Lucas an apology for not giving my paper to him on time, but I had too much time to write my paper, and so put it off until the last few days.

In regard to the percentage of syphilis, some statisticians have placed it as high as forty per cent. of the people of Germany, fifty per cent. of the French and sixty per cent. in the United States. That, I believe, is Dr. Buckley's finding. That is probably too high, and in all probability Dr. Gershwiler's statements were correct. I was not here, of course, when syphilis originated, but I have some pretty good evidence by a man who has made a careful study of the matter, and he cites us references in the bible of clinical cases of syphilis. He thinks Job could attribute some of his trouble to syphilis. He also says that there are bones, some of them perhaps prehistoric, found in the Orient which show characteristics of syphilis. He does not know for sure whether syphilis existed in Europe previous to the pre-Columbian time or not, but he is pretty certain it existed in the Orient. There has been recently a record dug up in Japan which describes syphilis very accurately, and whether Buckley is right or Pusey is right, I do not know. But I do know that we have more syphilis in the United States, in our state and town, than we should have, and as I said in the paper the physician alone cannot eradicate it. The people must be educated, and recently the magazines have taken up this education, and in one respect that is good, because it familiarizes the people with the dangers of syphilis. But magazine articles as a rule are spectacular and cannot be relied upon to any great extent.

I think the percentage of syphilis is decreasing, owing to the new method of diagnosis, owing to the greater efficiency of our present treatment. While it is not a sure thing, yet it is the most efficient and rapid that we ever have had, and owing to the fact that the public is becoming educated and interested, the number of cases is decreasing.

The question was asked me about the work of a dentist, whether he could work in a syphilitic mouth during the acute stages. For the sake of the dentist and for the sake of the patient, the work had better be postponed until the subject has had sufficient anti-syphilitic treatment to prevent the dentist from becoming infected, and to insure the safety of the patient; because work on a syphilitic patient is not always a safe thing for the patient. It takes only a short time as a rule to place that patient in a condition where he will not be a menace to the dentist. If we give him, as Dr. Gershwiler suggested, a dose of salvarsan every week for four or five weeks, the probability is that he will not then be infectious, although there can be no certainty, but at least I would give them that chance. Then again he is better prepared to receive the treatment the dentist wishes to give. Salversan unfortunately since the war began is impossible to obtain, but we have two very good substitutes, or not substitutes, because they are identical with salversan, which are made in America, one in Canada, the other in Philadelphia. Either of those will produce perhaps just as good results in the treatment of syphilis as the original salversan, and we are using it now with apparently as good effect.

In regard to the definite knowledge that Dr. Raper wants, that is something that nobody has. There is a general course which syphilis runs. There are many manifestations of syphilis, which should arouse suspicion. No one can say definitely that they are syphilis. Then is the time to appeal to the laboratory because the laboratory diagnosis, while not final and absolutely conclusive, is yet very strong evidence which must be taken into consideration with the clinical symptoms.

A Wassermann test returned negative does not exclude syphilis. A Wassermann test returned as a weak positive does not mean syphilis, because there are other conditions which will give us a faint reaction which simulates the reaction of syphilis. Therefore, in those conditions we are still at sea, and in those conditions we must consider the clinical symptoms which are presented more carefully than otherwise. A strong positive Wassermann reaction means syphilis absolutely. There are a few other diseases which they say will cause a strong Wassermann test; leprosy will sometimes do it, but in this locality we are not very likely to come in contact with leprosy, and that differentiation does not have to be made. It is claimed tuberculosis will give us a positive Wassermann test at times. This I hardly believe is the case, because in none of the cases where a positive Wassermann was obtained in tuberculosis have they been able to definitely exclude syphilis, and syphilis may be an underlying condition, and syphilis undoubtedly lowers the vitality of the tissues and makes them much more susceptible to other diseases, especially to tuberculosis, and many a case that has been diagnosed as pulmonary tuberculosis is in reality pulmonary syphilis instead, or perhaps both together.

In regard to a sterilization of the hands after working with a mouth that arouses a suspicion, I do not believe there is anything better than bichloride of mercury, but do not use it too strong. A weak solution, perhaps 1 to 5000 is better than a strong solution, because a strong solution will bring about coagulation and will protect the organisms rather than destroy them. An ointment of mercury rubbed into the hands carefully after a possible exposure is a good practice.

It was not my purpose to differentiate carefully between the different pathological conditions that resemble syphilis, because that would take too long. Thé purpose of the paper was simply to call attention to the dangers you run, and while there are many dentists who could diagnose syphilis just as quickly as any doctor, I know there are many men who are not looking for it and who do not think of it, and I believe I have seen some who saw only the two rows of teeth, and that was the principal burden of my discussion tonight. I thank you.

CYSTIC ODONTOMAS

BY G. B. NEW, M.B., (TOR.), ROCHESTER, MINN.

THE SUBJECT OF CYSTIC ODONTOMAS has not received in this country the same study that it has in England, Germany and France. The importance of the subject is readily appreciated when one considers the marked deformities of the face and jaws that accompany these growths, which early diagnosis and thorough operation might have eliminated in many cases.

Cystic odontomas will be considered under two classes—the simple cysts and the adamantinomas. The simple cysts are again divided into two types: Type A, including the cysts commonly called dental or root cysts, and Type B, those usually called follicular cysts and containing a partially formed tooth. The term "follicular" cyst used for the second type is misleading in that one takes for granted, without knowing definitely, that this type is developed from the follicle of a tooth. The term "dentigerous" cysts is used quite loosely, and may refer to either of the foregoing types of simple cysts. For this reason it has not been used in my classification.

Twenty-six cystic odontomas are herein reported from the Mayo Clinic. Twelve of these are simple cysts of Type A; six are of Type B, and eight are adamantinomas.

SIMPLE CYSTS OF TYPE A

The simple cysts (Type A) are the most common cysts of the jaws. Because of their little surgical importance, they have not received the attention which has been given to other cystic odontomas. Magitot[1], in 1872, published the first important work in the subject of cystic odontomas, and

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1. Magitot: Arch. gen. de med., 1872, ii, 339.
2. Malassez: Arch. de physiol. norm. et path., 1885, v, 129.
3. Scudder: Tumors of the Jaw, Philadelphia, W. B. Saunders Company, 1912.
4. Witzel: Ueber Zahnaerztl Cysten, Leipsic, 1896.
5. Bland-Sutton: Tumors Innocent and Malignant, New York, Cassell & Co., 1901.
6. Falkson, Robert: Beitrag zur Entwicklungsgeschichte der Zahn Anlage und Kiefer-Cysten, Konigsberg, p. 33.
7. Kruse: Virchows Arch. f. path. Anat., 1891, cxxiv, 137.
8. Buechermann, cited by Borst: Lehre von den Geschwuelsten, ii, 607.
9. Kolaczek, cited by Borst (Footnote 8).
10. Hesse: Deutsch. med. Wchnschr., 1912, xxxviii, 1360.
11. Lewis: Surg., Gynec. and Obst., January, 1910, p. 28.
12. Massin: Virchows Arch. f. path. Anat., 1894, cxxxvi, 328.
13. Stumpf: Centralbl. f. allg. Path. u. path Anat., 1910, xxi, p. 393.
14. Black: Dental Summary, 1909, xxix, 1, 83.
15. Barrie: Ann. Surg., September, 1905, p. 352.
16. Bloodgood, J. C.: Bone Cysts, The Jour. Am. Med. Ass'n. Oct. 15, 1904, p. 1124.

attributed their origin to the development of the embryonic dental tissue. Malassez[2], in 1885, found masses of cells about the roots of teeth in the jaws of adults and concluded that these were the remains of the dental ridge, the epithelial cord and the outer layer of the enamel-organ. These cells may be found near the teeth and are sometimes found deep in the jaws. Malassez called these masses of cells *debris epitheliaux dentaires*, and proposed the theory that all cystic odontomas were derived from this group of cells. This theory is the one most commonly accepted.

According to Scudder[3], this type of cyst is found more commonly in the upper jaw in the incisor and bicuspid regions. Of the twelve cysts of this series, six occurred in the upper jaw and six in the lower. Of those in the upper jaw, four occurred in the incisor region, one in the bicuspid, region and in one case the location was not noted. In the lower jaw, three occurred in the incisor region, two in the bicuspid region, and one in the molar region.

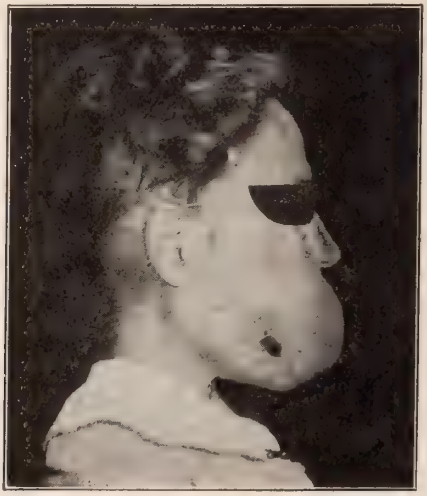

Fig. 1 (A89376).—Adamantinoma. Woman, aged 50. Duration of tumor, 21 years.

The typical mammalian dentition consists of forty-four teeth, and man has but thirty-two, a third incisor, a third bicuspid and a fourth molar being missing. The most frequent location for the appearance of supernumerary teeth is in the upper jaw in the incisor and bicuspid regions. Whether these teeth are a reversion to the earlier types in the mammalian dentition or simply mishappenings is a questionable point among those who have made a thorough study of the subject. It is interesting to note that this type of cyst and the supernumerary teeth most frequently occur in the same location, which might suggest that these cysts are derived from supernumerary anlagen.

The theory has been held for some time that these cysts develop from irritation or stimulation. The irritating factor may be the eruption of a tooth or some form of peridental inflammation. These cysts are frequently found in connection with the dead roots of teeth and thus the irritative factor, necessary to stimulate their growth, is accounted for.

Simple cysts of Type A occur at almost any age. Of the twelve cases reported in this paper, the youngest patient was 12 years of age, and the oldest 70. The cyst is usually about the size of an English walnut, but may attain great dimensions, and in the upper jaw, stimulate an enpyema of the antrum. In the lower jaw it may become as large as an orange. The cysts from our series varied in size from that of a cherry to that of a small lemon. Witzel[4] found tumors the size of a pea and smaller about extracted teeth. They were placed sometimes near to and sometimes distant from the root of the tooth. They contained fluid and had an epithelial lining indistinguishable from a larger cyst. The cysts have a smooth mucous membrane covering in the mouth; the wall varies in thickness and consists of a thin shell of bone. (Fig. 5.)

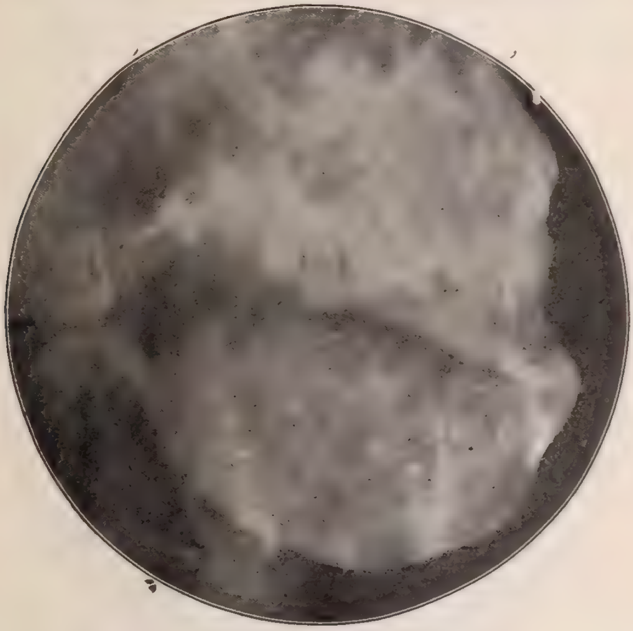

Fig. 3 (13523.)—Adamantinoma in woman aged 22. Duration of tumor, eight years. Tumor involving left half ot lower jaw.

SIMPLE CYSTS OF TYPE B

Malassez[2] believes that this type of cysts also originates from cells that he describes in the jaws. Bland-Sutton[5], however, believes that this type simply represents an expanded tooth-follicle.

These cysts occur in either jaw with about equal frequency and usually in the bicuspid and molar regions.

Of the six cases in our clinic, three were found in the upper and three in the lower jaw. Of the three in the upper jaw, one occurred in the bicuspid region, one in the molar region and in one case the location was not noted in the history. Of the three in the lower jaw, one occurred in the bicuspid region, one in the anterior part of the jaw, and one in the molar region.

This type of cysts occurs during or shortly after the second dentition, except those in connection with the third molar, which develop later in life. Although this fact is commonly known, this type of cyst may not cause symptoms or be noticed until later in adult life.

Of our cases, other than those in which the cyst occurred in the third molar region, the ages of the patients were 3, 14 and 28 years; of those in the third molar region, the ages were 27, 34 and 37 years.

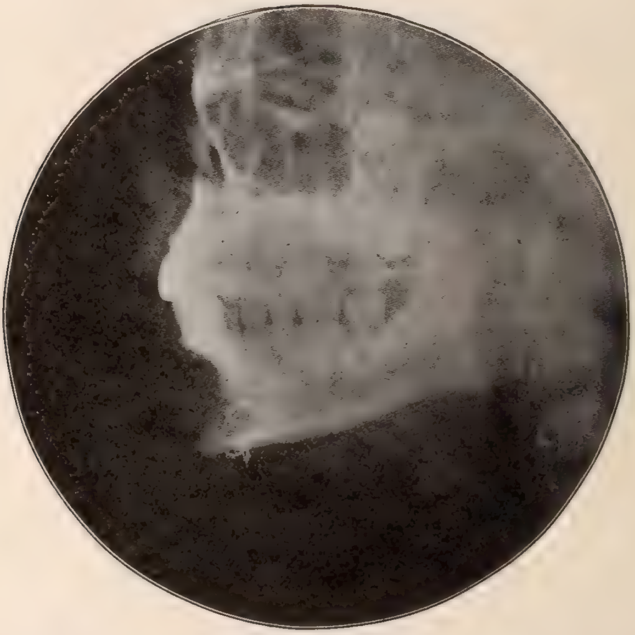

Fig. 4 (13523).—Same case as Fig. 3, showing transplanted rib in place after resection of tumor by Doctor Judd. Transplant healed nicely.

It is noted that a tooth is missing from the set and a partially developed one found in the cavity of the cyst. The crown of the tooth is usually complete and the root partially formed. These cysts occur about a partially developed permanent tooth and are rarely seen about a supernumerary tooth.

In one of our cases the cyst occurred in a man 69 years of age. He had had a tumor of the lower jaw near the angle for forty-two years, and during the last six months it had increased in size and the surface had become ulcerated in the mouth. The Roentgenogram showed a cyst with a partially developed molar tooth. A specimen from the growth, on microscopic examination, proved to be epithelioma. The extensiveness of the growth and the glandular epithelium involved made the condition inoperable.

This type of cyst has similar characteristics as to size as the cysts of Type A. The wall consists of thin bone and the mucous membrane covering in the mouth is quite smooth.

ADAMANTINOMAS

The adamantinomas, on account of their greater surgical importance and their interesting features pathologically, have given rise to more study than the other types of cysts. Falkson[6] in 1879 held that, in the formation of enamel-organs for the several teeth, there was a surplus of those formed and that these additional dental germs were the origin of the adamantinomas. Malassez' theory as to their development from the epithelial masses found in the jaws is accepted by most observers. Kruse[7] agrees with Malassez as to the origin of the cysts and reports three cases, each one typifying different stages in the development of the cells of the enamel-organs. Buechtemann[8] and Kolaczek[9] believe that these tumors originate from the mucous membrane or from the mucous glands of the mouth. Bland-Sutton[5] and others hold that they are formed from the oral mucous membrane. Bland-Sutton's argument against Malassez' theory is that they occur in middle life and that if they were derived from the embryonic enamel-organ, they would occur at an earlier period in life. Hesse[10] agrees with Falkson[6] as to the origin of these tumors from a surplus of enamel-organs.

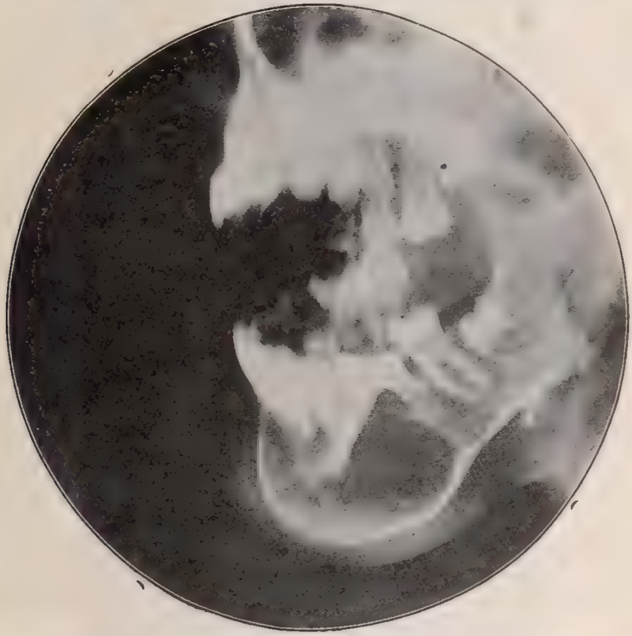

Fig. 5 (12017).—Girl, aged 10. Duration, four months. Simple cyst, type A, involving anterior of lower jaw.

The adamantinomas are most frequently seen in the lower jaw. Lewis[11] states that they are seen eleven times more frequently in the lower than in the upper jaw. The bulk of the tumor-mass is usually at the angle of the jaw, extending upward to the ramus and forward into the body of the jaws Sometimes the entire ramus is cystic with the tumor extending across the midline to the other side of the jaw. These tumors may originate in the molar or bicuspid regions, but are rarely seen originating from about the anterior teeth.

I have been able to collect nine cases in which the tumor occurred in the upper jaw, two from the Mayo Clinic. In only four of the cases reviewed in the literature were there definite data as to the location in the jaw. Four of the nine occurred in the posterior part of the jaw and two in the cuspid region. These cysts may originate close to the alveolar border or may start from deep within the jaw. Of the eight cases of adamantinomas from our clinic, six occurred in the lower jaw and two in the upper. Of the tumors in the lower jaw, in four the main mass was located in the angle of the jaw, in one in the molar region, and in one in the bicuspid region. Of those in the upper jaw, one occurred well back in the molar region and one in the cuspid region. (Fig. 1.)

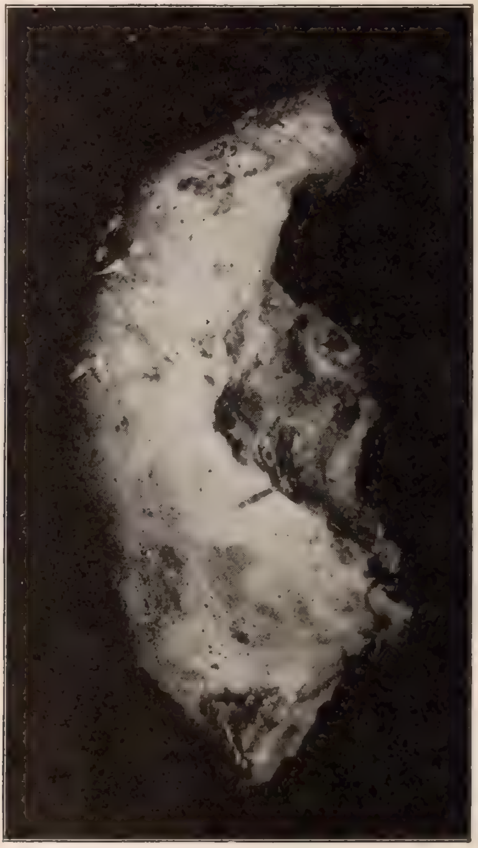

Fig. 6 (A59772).—Adamantinoma; gross specimen.

These cysts may develop at any age. Massin[12] reports a case in a newborn infant and cases have been reported late in adult life. Lewis[11] states that the average age of the patients in the seventy cases which he collected in the literature was 33. The average age of the patients in our group of cases is 27¼ years. Of the six cases from the literature in which the tumor occurred in the upper jaw, the average age of the patients with occurrence in the molar region was 33½ years, and of those with occurrence in the cuspid region, 16½ years.

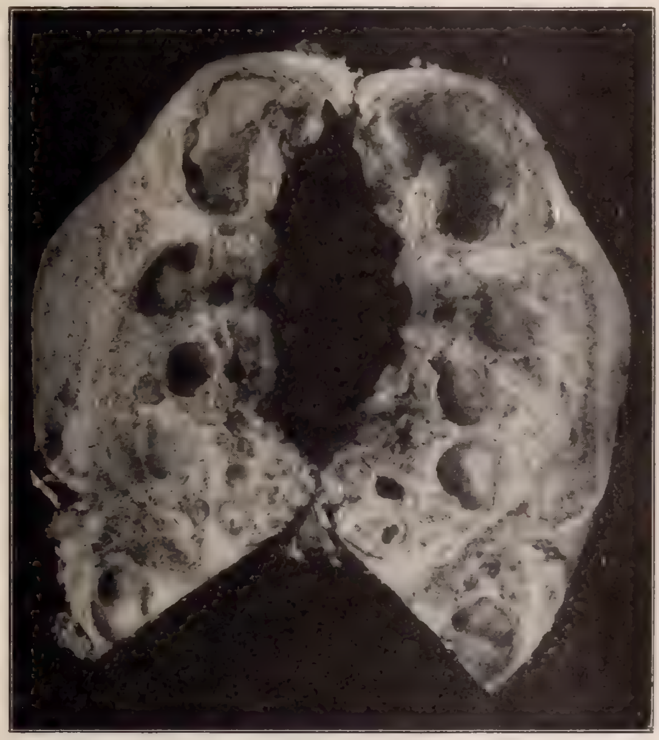

Fig. 7 (A59772).—Adamantinoma. Cross-section, showing the solid areas of the tumors and the small and large cysts with bony walls.

Stumpf[13] says that if either of the theories which have been advanced for the etiology of the formation of these cysts is accepted, one must assume some additional irritant factor as necessary in their production. The lower molar region receives more irritation than any other locality in the mouth. It is an accepted fact that the lower third molar is more difficult to erupt and more frequently impacted than any other tooth in the mouth. It is interesting to note that it is in this region and at the average age of 33 years, during or just at the time of the eruption of the lower third molar, that these cysts occur; and, also, that of the cases in the literature in which the upper jaw was affected, the average age of the patients having adamantinomas in the molar region was 33½ years, while that of patients with involvement of the cuspid region was 16½ years. This suggests that the eruption of the teeth may play an important part in the chronic irritation which is probably necessary to stimulate the growth of these tumors. If these conditions develop from supernumerary anlagen, the different locations in the molar region may be explained by the fact that, according to Black[14], the supernumerary molar tooth may occur in any location posterior to the first molar. The adamantinomas are sometimes associated with cysts containing partially formed teeth, but not frequently enough to make this a factor in the etiology.

It is difficult to obtain conclusive evidence of the association of the eruption and impaction of teeth to adamantinomas, as most histories are not of sufficient detail on this point. Hesse[10], in 1912, reported a case in which a lower third molar was found in connection with an adamantinoma, and believes that from a study of this case he will be able to find out more about these tumors. Two of the adamantinomas in our clinic were associated with unerupted third molars, one in the upper and one in the lower jaw.

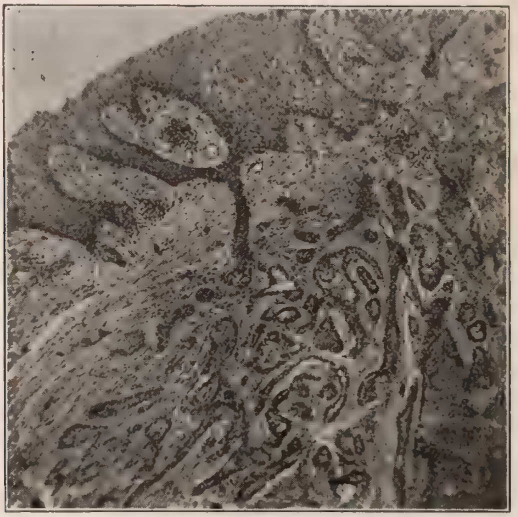

Fig. 8 (A68435).—Adamantinoma. Down-growth of the columns of epithelial cells and the various forms these take, surrounded by connective tissue stroma.

Of the seventy cases that Lewis collected from the literature, the average duration of symptoms was eight and one-half years. The duration of the symptoms on our cases was from ten months to twenty-one years. Duration of these tumors is difficult to determine on account of the long standing of the condition.

None of the cases reported in this paper had any glandular enlargement.

These tumors present a smooth mucous membrane in the mouth unless they are infected. The wall of the cyst consists of a thin layer of bone

Crackling may be elicited in some areas, on pressure, where the bone is thin, and fluctuation may be found in others. These tumors may give rise to great pain when they are of large size, because of pressure of enclosed fluid. One of our patients, who had had a tumor for twenty-one years for some years, in order to relieve the pain, tapped the cyst herself, as the fluid accumulated, by means of a sterilized hat-pin.

PATHOLOGY

The lining of the simple cyst, Type A, consists of a layer of fibrous tissue and a thin layer of flattened epithelial cells. In the older cysts the later layer may not be present, owing probably to the pressure of the enclosed fluid. Barrie[15], in 1905, reported a case of dentigerous cyst, which was probably a simple cyst, Type A, with typical adamantine epithelium, with no down-growth, lining the cyst. This was the first case reported with this type of epithelium forming the wall of the cyst.

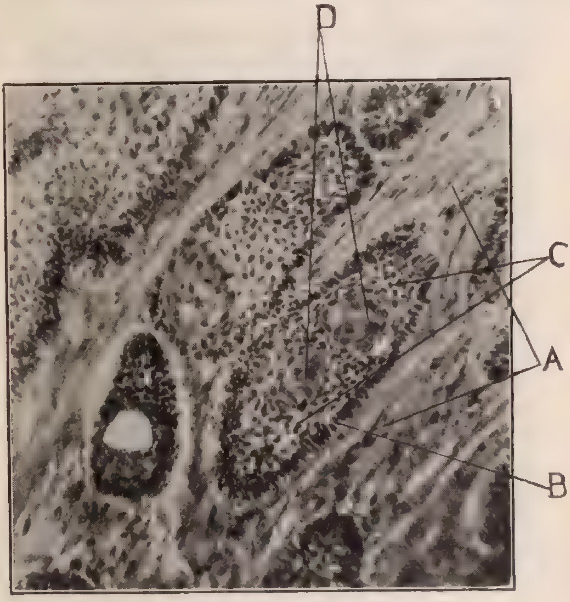

Fig. 9 (A 68435.)—A, connective-tissue stroma; B, columnar epithelium; C and D, differential cells. B, C and D are analogous to the cells of the enamel-organs.

The lining of the simple cyst, Type B, consists of a fibrous tissue layer. Some observers have reported an epithelial lining for this type of cyst also.

The adamantinomas on section present solid and cystic areas. The cystic areas vary in size from that of the head of a pin to that of an English walnut. They appear to have a smooth lining, and fibrous or bony septa are seen separating the various cysts. The cysts contain a thin yellowish fluid. The solid areas have a red tint and present a granular appearance, owing to the many minute cysts.

Microscopically, the solid areas consist of a fibrous tissue stroma and columns of epithelial cells. These columns may be elongated, rounded or arranged in the form of acini, and may present many irregular forms.

Two types of epithelial cells are found in these cell columns: the typical columnar cell with the nucleus placed near the pole away from the stroma, and the differentiated cells from this type—the polygonal cell and a stellate cell which form the main mass of the epithelial columns. These cells are analogous to the cells that form the enamel-organ. Areas of transitional forms from the solid cords to the small cysts are seen. The stellate cells are seen undergoing disintegration and their place being taken by cyst-cavities, at first quite small and then becoming larger. Stellate cells gradually disappear and are replaced by the fluid of the cyst. As the cyst increases in size, the columnar cells are alone left to line the cyst, while in the yet larger cysts these have disappeared and the wall consists of fibrous tissue only. (Figs. 6, 7, 8, 9, 10 and 11.)

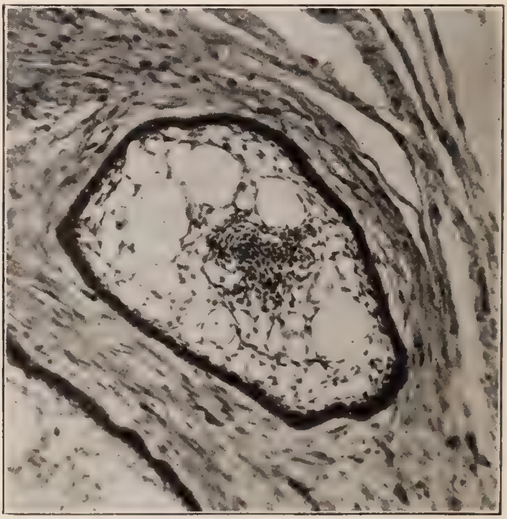

Fig. 10 (A59772).—Adamantinoma. Early cyst formation by the disintegration of the differentiated cells.

DIAGNOSIS AND TREATMENT

The diagnosis of the cystic odontomas, when the facts already noted are considered and with the aid of the roentgenogram, is usually not difficult. The roentgenogram will show a partially developed tooth, a uniocular cyst or the septa in the multiocular variety. The differential diagnosis from a giant-cell sarcoma is usually the most difficult, and this has frequently to be made at the time of operation or by microscopic examination.

The treatment of the cysts of the first group requires only a thorough curetting of the wall and packing the cavity with gauze. In the larger type, resection may be required to extirpate the tumor. The adamantinomas, however, require more radical treatment, since the simple curetting of the cyst does not permanently cure the condition if a small area of the tumor is left. In time the condition recurs. A resection of the jaw should be made, if possible, in this way all the tissue of the tumor may be removed. Different appliances have been used, including metal splints to hold the fragments of the jaw in position after resection, but the transplantation of a portion of rib seems to be the most satisfactory. (Figs. 3 and 4.)

Recurrence are frequently noted in these tumors, especially when the treatment has been conservative. Bloodgood[16] reports twelve cases of adamantinomas. One case was inoperable, and in eleven cases resection of the jaw was done. Nine of these patients were well from one to twelve years. There was one recurrence after the patient had been well for eight years. One died following excision of a hugh tumor involving both sides of the upper jaw.

Of the eight cases reported from our clinic, all of the patients have been operated on within the last two and one-half years, so that the final results cannot be given. One patient died of heart-trouble eight months after the operation, and two have been operated on within the last six months. In one case the tumor recurred, but the patient has now been well more than two years; one recurred after two years and the patient has been reoperated on for the recurrence within the last six months. In one case, on account of the extensiveness of the tumor and the fact that the cyst had fibrous walls which involved the entire half of the jaw and the ramus and extended across the midline, resection was impossible. The tumor was opened and the cysts curetted. Several small cysts have appeared since the operation. Two patients have had no recurrence; one case is of eighteen months' standing and one of two years'.

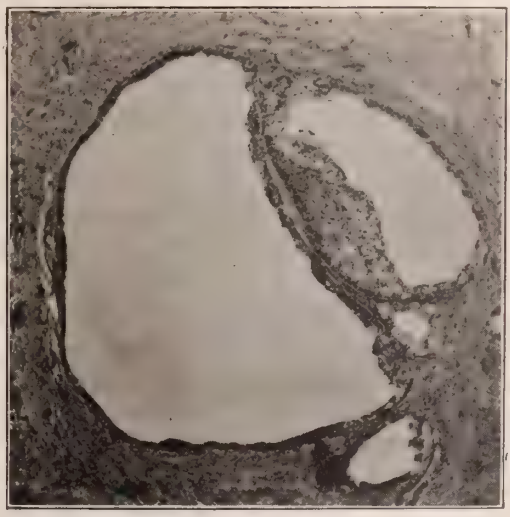

Fig. 11 (A68435).—More advanced stage in formation of a cyst. Very few differentiated cells are left. The cyst is lined by a layer of columnar cells.

"Self-protection is the first law of nature."

SOME OBSERVATIONS ON PROFESSIONAL ETHICS*

BY J. M. DOYLE, D.D.S., PERU, IND.

THE PURPOSE of this paper is to invite your attention to some aspects of a subject that must be of vital interest to every practitioner.

We may define professional ethics as rules of practice, of moral obligation concerning our rights and duties toward those we serve and toward each other. Mark you, at the outset, it is well to remember that these rules bind us morally; therefore there can be no temporizing, no clever keeping of the letter but violating the spirit. Each of us must answer before the bar of conscience concerning our fealty to the code.

It is well known that all of the learned professions must, in the nature of things, have some code written or unwritten that binds its members. You are reminded of the code which belongs to the art nearest our own, the Hippocratic oath, or the oath of the physician. You are reminded that Hippocrates, a Greek philosopher and physician, born 468 B. C., is supposed to have administered this oath to his disciples, and despite the changes which come with the circling centuries, still forms the base of the code of medical ethics.

According to the terms of this oath, the asseverator pledges himself to absolute purity of morals, and solemnly promises to practice his profession in accordance with the principles of humanity and honor. The novice further pledges himself to the most disinterested brotherhood with all persons legitimately connected with the healing art, and to deeds of kindness toward their offspring.

You may note that here begins the system of special practice, because the novice pledges himself to refrain from performing a certain cutting operation, there being at that day, persons who specialized in the work in question. The writer quotes verbatim the concluding words of the oath:

> "While I continue to keep this oath inviolate may it be granted to me to enjoy life and the practice of my art, respected always by all men; but should I break through and violate this oath, may the reverse be my lot."

We might well say that the sum of all essentials is contained in that sentence of the oath containing the pledge: "With purity and holiness will I pass my life and practice my art." Before we take leave of this Father of Medicine, permit me to bring to your notice the fact that in the system of surgery that bears his name, experts of this age find much to censure in the "Treatise on the Head." They say that Hippocrates was entirely too free in counseling trepanning. Who knows? Perhaps he was right. Has it not come under your own observation that some few of our fellow practitioners do not appear to comprehend the value of our code, nor is it possible to insert into their minds a comprehension of its value to them by any method short of an actual opening artfully made in their cranium?

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*Read before the Indiana State Dental Association, May, 1916.

I shall not take your time by reciting the facts concerning the history of our code. At the outset, it is well to remember that all codes are in their very nature a compromise between the element that asks for a great deal on the one hand, and the element that desires to be let alone on the other.

We pass now to a consideration of some of the salient sections of the code. The declaration embodied in Section 1, that the dentist, in all his relations with his patients and the profession, is to be guided by the Golden Rule.

Section 2 goes on to define specifically, rules of action concerning matters adverted to in Section 1. It is the opinion of the writer that these two sections contain "All of the law." Doubtless, if it were possible for a body of men to live according to the counsel "Do unto others as you would wish that they do unto you." this mundane sphere would be a most delightful place in which to abide. We have inscribed this sentiment upon our banners; from the battlements we proclaim our fealty to this principle. Let us not be lip-servers only, but with this watch-word written upon the fleshly tablets of our hearts, stand forth before the world as followers of the rule in our every act and deed.

Section 3 states but a self-evident proposition: I fancy there are none, even among those who walk not with us, who would deny the truth of the assertion, that "The dentist should be mentally, morally and physically clean and honest in all his dealings with his fellow-man, as comports with the dignity of a cultured and professional gentleman."

It is one of our choicest privileges that we are permitted to know so many gentlemen. At this very moment there are men who rightfully bear that grand old title, men "Whose aims are generous, whose truth is not only constant in its kind, but elevated in its degree; whose want of meanness makes them simple; who can look the world in the face with an equal manly sympathy for the great and the small."

It seems to me that little need be said concerning Section 5. Aside from all reference to our duty to live according to the code, a moment's thought ought to convince any practitioner that advantage, profit and pelf will not follow where one seeks to lead away from his fellow practitioner that which he has acquired.

We now come to the consideration of Sections 6 and 7. Here is the rock of offense; many a bright, clean, upright young dentist enters upon this broad way that leads to so much evil, and would, unless we of this association stand fast, in a short while make of our art but a trade. Therefore I am of the opinion that not only is it unprofessional to advertise in any of the ways designated in Section 6, but that the spirit of the code is violated by practices not enumerated therein. For example, I deem it unprofessional for a dentist to solicit, even indirectly. Many of you know of cases where the practitioner is at fault here. Certainly it is most unbecoming to say to a man "better come in and let me fix up those teeth." Yet greater abuse is it, when we read in our professional journals, advertisements soliciting young graduates to work in advertising shops. These offending journals live by us who keep the code; their existence would be but as a tale that is told; the editors of these journals sit in the high places in the synagogue, and yet have the effrontery to carry such matter as referred to above. I submit that this is a state of affairs that must be remedied.

If the lessons of history be of any avail, we must conclude that in every art that serves the people the conditions that obtain therein are the result of the labors of those who follow the professoins. Unless we ourselves believe in the dignity of our calling, and manifest our faith by a strict adherence to the rules of the code, it is but futile to hope for consideration by the laity

Doubtless there are few occasions where practitioners are tempted to depart from the code by fee splitting and kindred practices. Not many years since the muck-raker was abroad in the land, and it appears he discovered much of this sort of thing in another profession. I mention this only to show you what a delicate plant public esteem is. Remember, that there is ever a part of mankind that desires to think evil.

Art. 2. Here we have a declaration only. I take it that we are as one upon the declaration, but do you believe that physicians are as ready to recognize our position?

Now, in conclusion I would urge upon every one who follows our noble art, an honest attachment to the principles of the code. Of course, neither it nor any other human institution is perfect, but let it guide us. Though the Golden Calf be set up in many places, let us not depart from integrity, nor do that which is beneath the dignity of our calling.

I am no prophet, nor was my father one, yet I assert that this profession of ours is to go on to do great and greater deeds for humanity, that ages to come there will be practitioners of wonderful skill. It behooves us all to be mindful of our obligations for.

Whoever may
Discern true ends shall grow pure enough
To love them, brave enough to strive for them,
And strong enough to reach them though the road be rough."

DISCUSSION

I. L. Furnas, Indianapolis: I have listened with a keen interest and very great pleasure to the reading of Dr. Doyle's paper. Keen interest, I say, because I believe that the time is close at hand when this subject will be one of the foremost before our profession.

Dr. Doyle has said some very beautiful things about our very necessary "Code of Ethics" and they should all receive the unanimous support of this meeting; but on the other hand there is a different side; one which we might speak of as being a more liberal view than the one which we have heard so beautifully presented this morning.

Now, understand me; I believe in our code of ethics. I would not see it abolished for the world; but just for the sake of argument and getting both sides of this question before you, I am going to champion the side of the "Liberalist" and try to present to you his views as I may see them.

First, may I advocate a change in our code? A shortening, for search as you may, you cannot possibly find one section of this code which does not go directly back to the Golden Rule, or "Do unto others as you would that they should do unto you." Therefore our code of ethics is too long. An attempt at explanation has resulted in confusion; hence we have so many interpretations. This confusion has been a big factor in producing two large factions within our ranks that we have been pleased to term the ethical and the unethical dentists.

The ethical practitioner places his practice upon a higher plane and devotes his energies first to serving humanity and helping his fellow-man.

The unethical man as an average holds the dollar so close to his eye that he can see nothing else, and conducts his practice solely for his financial remuneration. He has discovered that to extract teeth without pain and insert bridges and plates means more money to him than the insertion of an amalgam restoration or gold inlay. He has been keen to observe also that the more he tells the people "this is the proper thing to do" the easier it becomes for him to accomplish it. So he has resorted to the newspapers and here he daily tells the people what he can do and how cheaply it can be done. In other words he is educating the public to believe in his methods, and consequently they, in ignorance, pay the penalty in both money and health.

The ethical practitioner has interpreted this code differently. While our code of ethics makes no direct statement concerning this publicity, yet in section two we find the following:

> Sec. 2. It is unprofessional to resort to public advertisement, cards, handbills, posters, or signs, calling attention to peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; or to use display advertisements of any kind, or to operate under any trade name or general "Dental Parlors" designation, to publish reports of cases or certificates in the public prints, to circulate or recommend nostrums; or to perform any other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by cards, simply their names, occupation, and place of business, or in the same manner to announce their removal, absence from, or return to business, or to issue to their patients appointment cards, having a fee bill for professional services thereon.

Therefore we have been taught to believe that most any use of printer's ink is unprofessional, undignified and should be tabood. Here we are wrong. The stand against publicity or advertising taken by our profession is fifty years behind the times. I firmly believe that this subject is the largest with which we have to deal today.

When I say "advertising," please do not think of the kind which you see in every paper you may pick up, We never should resort to that; but there should be—and in time to come there will be—a great campaign of cooperative publicity that is national in its scope and educational in its value. I say again that it will come. It must come, for it means the health and happiness of the public. It means the saving of lives. The public is daily sacrificing its health because of the misleading advertising and cheap work of the quack dentist. Why does the dental profession sit idly by and allow that which rightfully belongs to them, and the thing which they need most, to be abused till they will not claim it as their own?

We, as dentists, possess certain knowledge which would greatly benefit humanity. This possession forces upon us the obligation of giving, and we are not fulfilling this obligation unless we give it in the way in which it will do the most good, and just so long as we adhere to our present methods of educating the public, we, as dentists are not fulfilling the duties which we owe to society.

That which we must show to the community is the value of the right kind of dentistry regardless of price, and that they should expect to pay a good fee for good services. We must bring this before the ninety per cent. who never go inside of a dental office except to secure relief from pain, and there is but one right way to do this—through the newspapers and every other medium of publicity. The day for individual advertising for dentists never will come, but the day for cooperative educational publicity is here.

It has been well said that, "what the eye sees and not what the ear hears carries over ninety per cent. of what the mind retains;" therefore we must show the public in an attractive manner that proper dental treatment is of vital importance to them, and to accomplish this there is no better medium than good, clean advertising forcefully setting forth the truth. We are professional men, we know the right, and knowing the right we are obliged to give it, attractively, forcefully, and honestly. Give it verbally, through the printed circular or the public press, and in the end we will find the public as easily educated to the true as to the false.

Mark you. I am not advocating the dropping of all educational work now in hand. This will all help, of course. The work that is being done in the public schools is an excellent thing and will accomplish much; but there is not enough of it. A public school receiving regular dental services is so out of the ordinary that special mention is made of it throughout the state.

The manufacturers are carrying a large bulk of our responsibility for us. Such firms as the Florence Dental Mfg. Co., Colgate, and many other dentifrice manufacturers, have done more to teach people how to care for their teeth properly in the last five years, than the entire dental profession has accomplished in the last twenty-five years.

The medical profession now and then exposes our neglect by writing articles on the teeth for the popular magazines and newspapers, and I might add that these articles frequently appear in the magazines' Health Department, which is a part of the American Medical Association's cooperative publicity plan. *Leslie's Weekly* recently contained two excellent articles on dentistry written by a layman of no special professional training whatever.

The public is beginning to realize that the teeth are of great importance to general health, and craves education and information along this line, and we, the so-called ethical dentists, are apparently satisfied to sit back and permit them to be humbugged into believing that teeth can be crowned properly for $3.00, and other such rot.

Friends, is this doing our duty? Are we not violating our code of ethics in an over-religious effort to keep it sacred and inviolable? Have we not been too severe in our interpretations? Have we done unto others as we wish to be done by?

Now let us look to a solution. Let us seek the light of the twentieth century sun and fight our battles, not with ancient and discarded implements of warfare, but with up-to-date methods of attack.

The State or National Dental Association should organize a publicity or advertising campaign far different from any other they have attempted. They must do something to educate the dentist as well as the public. They must show him, from a standpoint of dollars and cents, that he can not afford not to belong to the National, State and Local dental societies. I will admit that it is a sorry state of affairs, but nevertheless it is true, that a big majority of the dentists of this country place their financial success far above their professional and moral obligations, and until our dental societies realize this fact and go out for their new men prepared to show them that it is money in their pockets to join, there are many, many ethical dentists who are eligible but who never will belong to any professional organization. This fact is proved by the last report of the Secretary of the State Board of Dental Examiners, which shows 1534 dentists registered in this State, and the Indiana State Dental Society with a membership of only about 600.

Therefore I say that we should conduct an advertising campaign and conduct it along modern twentieth century lines. An advertising campaign, not for patients, but for dentists. When this is finished we will then be ready to carry on one of the greatest educational campaigns that the world ever has heard of. An organization with two factions pulling in opposite directions, such as we now have, can never accomplish what it should. Now I believe that by the following method, or by a plan based upon this system, we can take a great step in the right direction:

The National Dental Association shall appoint an advertising or publicity committee, headed by—not a dentist—but by the best and most experienced advertising expert they can secure. This committee can then perfect and put through the following plan:

A slogan, or what might be called a trade-mark, shall be adopted. This must contain the name or initials of the National Dental Association, or N. D. A. These letters to be very prominent and always of the same type or design. They should be arranged on some distinctive background and in a particular way so that they might be easily remembered. This slogan should then be made a part of the every-day life of every man, woman and child in the United States, through the medium of the daily papers, weekly papers, all monthly publications, billboards, street-car cards, and every other way that it can be brought to the notice of the public. It should be made just as common as or even more common than the familiar Coca-Cola, B. V. D., Quaker Oats, Fatima, and any number of others that we all know so well.

This slogan should always be accompanied, whenever possible, by a very short notice explaining to the people what it is, telling them that the N. D. A. is an organization for the advancement and betterment of dentistry; that it is composed only of dentists who are reliable, conscientious and capable of doing good work. No man of questionable character or methods can belong. Then advise them to look in their dentist's office for the N. D. A.

Each dentist when he pays his annual dues shall as a receipt be given a card, possibly 4-inches by 8-inches, reading:

MEMBER OF THE
N. D. A.
1916

The date to be changed according to the year. This card he must place upon the wall of his reception or operating room as a guarantee to his patients of conscientious efforts.

This will of course necessitate the organization of many censoring boards, working under strict rules in order to prevent the public and the profession from being imposed upon, but I believe that this could be successfully handled by dividing each State into sections or districts and appointing a committee of three or five men for each district to act as a Board of Censors. All matter for publication from local sources must go first to them, and then to the papers. No names should be used, all articles simply being signed, "N. D. A."

Each district committee shall arrange with the newspapers that they print only such dental advertising as may be received from the committee or board, each Board of Censors having the power to contract for sufficient space yearly to obtain such a contract. This arrangement can be made, because all publications are eager to insert clean, truthful advertising in the place of that which is published with the sole intent of misleading, misrepresenting and defrauding.

Then when this is done we will see a change—a change that the most enthusiastic can not contemplate. You will see the best class of advertisers, if there is such a class, joining the ethical men by the scores, changing their ads. and practices to conform to our ideals. The man who will not subject himself to the change can not long endure. Then it will no longer be necessary for the good men of our profession to sit back and silently let the bad men do all the talking.

V. C. **Haskett**, Bloomington: I certainly want to congratulate Dr. Doyle on having what I believe to be an excellent paper and to heartily endorse it from beginning to end. He has brought out the real meaning of the code and the purpose for which it was formed.

Dr. Furnas has touched on some very interesting points in educating the public, which are new and deserve consideration.

It seems to me the fact that we are bound morally by our code, as emphasized by Dr. Doyle, should be the strongest incentive toward its religious enforcement—for isn't the simple statement, "that this man's word is as good as his bond," one of the highest, if not the highest compliment that can be paid to any one?

So it behooves all of us to keep eternal vigilance lest unconsciously we fail when we least expect to.

Again quoting the essayist: "It is well to remember that all codes are in their very nature a compromise between the element that asks for a great deal on one hand and the element that desires to be let alone on the other."

That in itself gives us a broad field within our own association; to keep on asking for more from each individual and by constant insistance lessen the latter element till it is completely won to the higher ideals, and then realize our last year's slogan, "A Better Individual Dentist."

In further fulfillment of the Golden Rule and to quote the second section of our code, "One dentist should not disparage the service of another to a patient; criticism of work which is apparently defective may be unjust through lack of knowledge of the conditions under which the work was performed. The duty of the dentist is to remedy any defect without comment."

Here lies a great temptation to the young practitioner, for when he first locates, full of enthusiasm and with high ideals as he should be, it is hard for him to understand why every bit of work he sees is not in a perfect condition, unless it has been faultily constructed, or grossly neglected. But he soon learns—and when his first disappointment begins to return to him—how much better he feels and how much better do his fellow-practitioners regard him if he has thoroughly mastered the code and lived up to its moral obligation, as he has been directed to do.

Then to return to the older men who have already attained their practice, but who in the natural course of events will lose a few to the new arrival. How many times do they fail to keep faithfully their moral obligations, and rather by implication than by actual statement, tend to lessen the confidence of the people in the new graduate? Happily I can speak only of the above from observation and not from personal experience, for my lot has been cast among gentlemen—men who have done in the past and still do all in their power to aid a youug and struggling dentist. They believe fully in their implied moral obligation.

The other sections immediately following are so plain and so universally accepted in all walks in life as to preclude any discussion relative to dentistry.

But passing to the last portion of our code we find where the most bitterness and dissension has been and always will be—that dealing with publicity or advertising.

I, too, feel it unprofessional to violate the code in spirit; in using our social acquaintances to "draw them in," or in any other subtle way to solicit patronage.

Then as to advertisers: Each one of us knows of case after case where in some instances our best friends, often the best fellow in the class, has committed the unpardonable and been cast out by the association.

Why is this so? Is it because we do not sufficiently impress our ideals upon the student, for we often pass over this most important violation with a shrug and let it go at that? Do we fail to clearly show them the dignity which rightfully belongs to our profession, or are we content to allow them to form their own opinions from others than from ourselves, instead of doing every thing in our power individually and collectively to instill a love and respect for our ideals and prevent them from soon regarding themselves, and us, as tradesmen rendering only such services as an ordinary mechanic could soon learn to do, thereby completely losing sight of their professional calling—for how many dentists who transgress these portions of our code ever rise above skilled mechanics? Only a very few ever do.

Why shouldn't we refuse to support those professional journals which openly flaunt advertising, and as much as any one thing tend to lead astray the young graduate and often him of greater years?

We are not living up to our obligations unless we always conduct our practice in a way becoming an educated dentist, doing what we know to be right, bending every effort to avoid the least solicitation; but rather conduct our practice so that, "By their works ye shall know them."

From an editorial in the *Dental Register* I find this significant conclusion regarding our code of ethics:

"The advertising game is always a self-centered propaganda, and that is one of the reasons why it is considered by the profession to be unethical. It is unethical because it is unfair. It is unfair to other members of the profession and it is always likely to be unfair to the public. After all, it is and always has been considered unprofessional to advertise our services in a competitive manner; and why, then, should we break with a tradition that binds us together as a brotherhood, with the high and noble ideal of attaining the highest skill and knowledge that we may the better minister to human suffering? Our code of ethics is not old and obsolete. It is stronger and more binding today than when Hyppocrates ffirmed it two thousand years ago. It will live forever, because it is based on a fundamental truth that has been reaffirmed in every honorably intentioned dentist who has accepted and lived it conscientiously."

DR. EDMUND NOYES, Chicago: Your president has given me so very flattering an introduction, that it threatens to choke me. It is a great pleasure to me to meet the Dental Association of the State of Indiana. I congratulate you sincerely upon this paper and this discussion. It is most admirable and timely. Some of you know I have been talking on the subject of ethics to the extent of eight to twelve lectures a year for about twenty years, and I have tried to impress upon the students of Northwestern University Dental School the foundations upon which our ethical code stands. It has been said here that it stands firmly upon a question of fundamental morality, and any code of ethics which has not that standing and foundation cannot be defended or enforced. We have had much in the journals in the last few years which shows a misconception of the whole matter, and generally speaking it shows a total want of discrimination as to any difference in the moral obligations of what we usually understand as a business man, and the moral obligations resting upon what we call a professional man. These differences are important and are the foundation of our special code of ethics. This does not mean that a business man is not called upon to be just as good, just as moral, just as faithful to the Golden Rule as a professional man, but the scope of the application of that rule to a business is much narrower and much less important than it is in the case of a professional man, and it is the failure to recognize this difference that is the most serious source of disagreement and misunderstanding in the profession in regard to ethics.

The controversy chiefly relates, of course, to the question of advertising. This is not because the question of morality in advertising is the most important moral question in professional life, but it is because it is the line of conduct which is the most conspicuous and most distinctly and positively determined. If a man lapses in honesty or in a good many other moral qualities which I might enumerate, it is not so easily proved against him, and there is much more reluctance to be an informer or prosecutor; possibly because those lapses do not affect so directly his fellow practitioners.

I think the second essayist has indicated the line upon which we must proceed. Publicity is very desirable. Dr. Furnas outlined a practical method by which it can be carried on. We cannot allow the publicity of personal advertising after the manner of business advertising. The fundamental reason is this: There is no objection in the world for a man to advertise commodities and goods in any way he chooses, if he tells the truth, but I cannot concede that any self respecting man, professional or otherwise—unless it be in the dramatic profession or some of those akin to that, in which personal publicity is more indispensable and in which the appeal to the whole public is more necessary—aside from that I cannot conceive that any self respecting man would be willing to go into public advertisement of his personal character, attainments, qualifications, the equipment of his office, the scale of his prices, (which cannot be announced honestly and definitely), and all those things that are personal. The distinction is easily made and important between personal advertising and the advertising of commodities. But it is desirable, as has been suggested, that the public should be informed in regard to dental services, their importance, the way in which they may be judged, and a great many other things about them. The sort of publicity that I mean is pretty well illustrated in the articles day by day in the *Chicago Tribune* by Dr. Evans. As I understand it, Dr. Evans is not practicing medicine, which leaves him free to talk to the public about medical practice and the care of health. I have watched his articles for several years, and they seem to be the most sensible and the most useful of any set of popular articles or instruction I ever have seen in regard to health matters. Now, there is no reason in the world why the dental profession may not have publicity of that sort. That would be only slightly different, if different at all, from that proposed by Dr. Furnas. I thank you very sincerely for your welcome here to me, and congratulate you again upon the character of this paper and this discussion.

Dr. H. C. Carr, Indianapolis: Last year a young man, in a maiden effort, coming before our assembly in apparently an impromptu manner, stood before us and shot from the shoulder some of the most forcible arguments I ever heard from anybody. That was our essayist, Dr. Doyle, and so when the committee was casting about for someone to handle this subject, I took the matter up with him. At first he said he did not believe he was equal to it, but I wrote to him again, and in about ten words, he said, "I will do the best I can." I think Dr. Doyle has given us a very excellent exposition of what is contained in the code of ethics, and I want to thank him for his efforts. In looking around for a discussor of the paper, my attention was called to another young man, and when I approached him, he said, "I cannot do it; I never talked before the public in my life, I haven't anything to say, and couldn't say it if I had." I said, "You try." And Dr. Haskett has given us an excellent discussion of a most excellent paper. When I thought of somebody else to take part in this discussion, I thought of another man who, from my point of view, is an unusually liberal-minded thinker on this subject. I heard him give a paper before our local society, which was a wonder, undoubtedly the most wonderful piece of literature I ever read. He advocated some of the greatest things, that if the National Association could follow out, would put the biggest advertisers on the face of this earth, in commercial lines, clear down and out. From my point of view, I believe that he has William Jennings Bryan backed off the board when it comes to being a dreamer. However, Dr. Furnas, to whom I refer, has modified his opinions and views on this important subject to such an extent that he has taken all the thunder out of my talk. I had occasion to discuss his original paper several months ago before our local society, and we had some fun. But he has modified his opinions, and they are today to my mind fairly acceptable.

Dr. Brown, Elwood: They say the dentists are the poorest business men of any class of people. I know of only one other class of people so poor and that is the ministry. Is it any wonder that the members are poor business men when they only have ten or twelve per cent. of the people to come in contact with, only ten or twelve per cent. to draw from? And perhaps the ministers do not have any more. I believe we might bring this before the people in such a way that it would be beneficial to them as well as ourselves. For instance, we might say, "Dr. Smith is located in the Jones Block," and then two or three lines below say that only ten per cent. of the people have their teeth properly cared for. Let that be for three or four weeks until it has soaked in, and then change it. "Teachers of public schools show that the students are much more efficient who frequently consult a dentist"; and let that soak in. Then change to something like this: "Insurance societies have shown that the expectation of life has increased three and a-half years since dentistry rose to higher plane". And that might go on and on, and I believe that it would be a good thing for the people, it would be a good thing for the dentist, and after awhile he would be considered a better business man because he has a little more money.

H. C. Sexton, Shelbyville: Just a few things occur to me about advertising and the code of ethics. One is the difference between the merchant's advertising and the professional man's advertising. When a merchant advertises he advertises the product of other men's skill. He does not produce anything in his store at all; he simply handles it, and it is not bad taste for him to say that it is the highest product of that special manufacture. But when a professional man advertises, it is a different matter. He is not speaking of someone else's skill, but of his own, and it is a matter of bad taste, and it goes against the grain of all cultured people. That is the reason individual advertisements of professional men never will be accepted by cultured people.

The greatest power in the world today, I think, is undoubtedly the power of the press. The church is a great power, it speaks to a great many, but the press speaks to more. A man will go to church possibly one day in the week, but every man will read his paper every day, and his whole mental foundation and thought will be built upon what he reads in that paper. Now this greatest power in the world today, what have we done with it? We have turned it all over to the most ignorant, the most unprincipled, the most unscrupulous part of our profession. We have said to the quack, "Here is the greatest power in the world today. Take it and use it as you want to. We will have nothing to do with it at all." And what has been the effect of that attitude of ours upon the press, in forming its attitude toward ourselves? The press looks upon us as prudes. It thinks we are foolish, and we are, and it has created a great opposition, not only in the advertising part of the press, but in the editorial part as well. They are always casting slurs and slings upon the professional man and his code of ethics, and it is because we have not used this greatest power in the world today. In fact, our non-use of it casts a reflection upon that power, upon the public press. We do not recognize it at all, and our attitude should change. We cannot use the public press as individuals, but we should use it as a profession, as associations, use it towards educating the public. We have heard talk about the opposition of the Legislature to our laws. What is the reason for that opposition? It is simply our neglect of the public press. Here is the greatest power in the world today. We should use that power to educate the public, and the public would then demand of the Legislature good laws. We haven't done it. The fault lies with us. Let us use the public press, use it to educate the people, and use it to educate the legislators, then our troubles will end.

Dr. J. M. Doyle, Peru: (Closing): I wish to thank you, gentlemen, for the part you have taken in the discussion. The paper amounts to little unless ably discussed. I wish to take issue with Dr. Furnas in his publicity campaign. He has told us that the time is here or will be here shortly. If the time is here, or if it ever gets here, God help us. Your secretary very ably put before you this morning the crisis we are about to meet in dealing with certain conditions; can't you see that to resort to advertising in any way would be playing right into the hands of our enemies? The Indiana Dental Society is scarcely self-sustaining. In order to carry on an advertising proposition on the smallest possible scale, it would cost a large amount of money. If you know anything about advertising, you will agree when I say it is an expensive proposition; those fellows could put up more money in one year than we could in ten. I think we should do something, and not sit idly by. We have in mind what the *Chicago Tribune* did for the quack medical man in Chicago. It put him out over night. Isn't it possible for us to get one paper to do the same thing that the *Chicago Tribune* did? They are starting on the dentists now. Pay attention and see what happens. I do not know who was responsible for those articles or for those people taking up the campaign, but isn't it reasonable to assume that somewhere along the line the American Medical Association or the medical associations of Illinois have had something to do with it? I think that is the way we could do it. If we could make it attractive enough for the public press not to handle the advertisers' stuff it would stop. We can educate the public through the public schools. We may not do it today nor tomorrow, but if we are not selfish and think about our children and their children, it will come as sure as I am talking to you.

Another thing, we do not pay enough attention to the young graduate. There is nothing more beautiful than a graduate's idea of professional ethics. Have you ever talked with them just previous to their graduation? The atmosphere in which they have spent their school days, make their ideals of professional ethics beautiful. But take some of the boys after practicing six or eight months, and you find entirely different men. What is the difficulty? They go into a community of fifteen or twenty dentists, and they are coldly received, and it is only a matter of a short time until they find themselves backed up against the wall and desperate for a meal ticket. Previous to their graduation they had never felt the weight of responsibility, they must do something big. I have talked with fellows before graduation, and their idea of professional ethics was most high, but in six or eight months something had happened. One fellow did advertise. He put his name in the paper and stated what he could do, he told me that he did it merely to get the people to know he was in town, that he didn't like the idea, but had to do it to exist.

If those men in the community in which he located had taken that boy and done something for him, taken him down to the public school perhaps and made him conspicuous, he would not have advertised. We had two advertisers in our town. They advertised a little while and they have stopped, they are coming up on their prices, and they will be with us, simply because we make it so pleasant for them and make them believe they are missing so much by not being with us. I think that can be done in any community. The moment we resort to public advertising, I believe we are doomed absolutely.

Connecticut Northeastern Dental Association

The Northeastern Dental Association will meet at Foot Guard Armory, Hartford, Conn., on Oct. 11th, 12th, 13th, 1916. A very interesting meeting is being planned and a large attendance is expected.

Alvin A. Hunt, *Secretary.*

EDITORIAL

THE NATIONAL DENTAL ASSOCIATION MEETING

It was a hot time in the old town when the National Dental Association met in Louisville, Ky., July 24–28, 1916.

Despite the heat there was an attendance approximating three thousand members and the program was one of the best ever presented, much of scientific and practical worth being given. The program was too elaborate to give even a synopsis of it here.

We might say, however, that the "descriptive clinic" idea, instituted at the meeting of the Ohio State Dental Society last December by the program committee, was included in the National Dental association program, and eight "illustrated lecture clinics" were given from the platform before the whole assembly on the afternoon of Wednesday, July 26th, and proved a taking feature. Other societies will profit by adopting the "descriptive clinic" at their meetings.

Organized as it now is the National Dental association is in shape to give the profession a great fund of useful knowledge, as its efforts are all directed toward enlightenment of its members.

The dues of members of the association were raised from $1.00 to $2.00 in order that the Journal of the association could be published monthly instead of quarterly as is now being done.

The House of Delegates adopted a resolution requesting the trustees to fix future convention dates for the week following the middle of October. This will be a great change for the better and we predict that it will add greatly to the attendance of the meetings; certainly to the comfort of those attending. New York city is the place chosen for the meeting next year.

Officers elected for the ensuing year are:

President, LaFayette L. Barber, Toledo, O.; first vice-president, A. P. Burkhart, Auburn, N. Y.; second vice-president, M. E. Vance, Lincoln, Neb.; third vice-president, Henry Clay Hassell, Tuscaloosa, Ala.; secretary, Otto U. King, Huntington, Ind., (re-elected); treasurer, Arthur R. Melendy, Knoxville, Tenn., (re-elected); trustees, Waldo E. Boardman, Boston; Clarence J. Grieves, Baltimore; Marcus L. Ward, Ann Arbor, Mich.—(all re-elected.)

Perfect harmony prevailed during the election, every officer being chosen unanimously.

An amendment to the constitution was passed providing that hereafter the president shall be elected a year in advance and this necessitated the election of both a president and president-elect this time. Dr. W. H. G. Logan, Chicago, was elected president-elect and will take his seat in 1917, at the expiration of Dr. Barber's term.

NOVOCAIN AND THE HARRISON ACT

Acting upon a court decision that seemed conclusive, we were glad to announce last month that novocain and novocain products were no longer "under the ban" of the Harrison narcotic law. It seems, however, that the Internal Revenue department has other opinions. Anyhow, the following communication has been issued by the commissioner:

> "You are advised that this office, in its interpretation of Section 6 of the Act in question held that novocain, *which is a synthetic substitute for cocain*, came within the scope of the law, and that all persons selling, dispensing, distributing, or administering this drug, were required to register and comply with all the provisions of the law, and regulations. Subsequently the manufacturers of this preparation entered suit against the Collector of the district wherein the manufacturers were located, for the recovery of special tax paid under this act in order to test the interpretation placed upon the law by this department, and at the trial in the United States District Court, Southern District of New York, which was held recently, the Judge decided that novocain did not come within the purview of this act. The department has not acquiesced in the dicision, but has requested the Department of Justice to carefully examine the transcript of the record in order to perfect an appeal for the Government, if the record permits. In view of these circumstances, the department has advised every person making inquiry that it considers novocain in the same status as before the ruling of the Court, and that in order to avoid any possible charge of a violation of the act, those persons handling this drug should register and keep a record, etc., as heretofore, until a final decision has been handed down by the Court *which is acquiesced in by this department.*"

The Italics are ours. The commissioner seems still to be laboring under that same old delusion that novocain is a synthetic substitute for cocain in the narcotic sense, which it emphatically is not, so far as our information goes.

It is a source of surprise to learn that court dicisions must conform to the ideas of any Governmental department, and that such dicisions do not "go" until "acquiesced in" by such department.—*G. E. H.*

OBITUARY

Dr. George Howard Foster, an honor graduate of the Dental Department, Ohio Medical University, died at the home of his mother, at Sugar Grove, Ohio, August 1, 1916. He was born there August 19, 1877. Spent two years as teacher in the local schools before studying his profession. After graduation with the class of 1903, he practiced in Columbus, Ohio, associated with Dr. Alden Bush, until 1908, during which time he spent two years as superintendent of the operative clinic in his Alma Mater.

Dr. Foster was a member of the Xi Psi Phi Dental Fraternity, and of the Columbus Dental Society. During the past seven years he had been confined to his bed suffering from complete ankylosis and blindness. He was unmarried and is survived by his mother, brother and three sisters.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

Limitation of Silicates

These results show conclusively that dependence cannot be placed in silicates, in their present imperfect state, to preserve the mesio-distal diameter of teeth or to withstand the forces of mastication. When their use is desirable for esthetic reasons in this class of cavities, that portion of the restoration exposed to stress and forming the contact point must be constructed of cast gold formed to retain a facing of silicate.—*C. O. Simpson, Dental Cosmos.*

"Curing" Pyorrhea

The only "sure cure'" for pyorrhea is "never to let it begin." Too many nostrums are to be had, and are in use today, and, sad to relate, too many the composition of which most of the dentists who use them are absolutely ignorant. In many instances more beneficial and lasting results could be obtained by the judicious use of Epsom salts. But let us get away from this word "*cure*," and stop creating a false impression on our patients. Let us be honest in telling them that we do *not cure their pyorrhea, but that we do offer them relief* from the acute symptoms, and where possible, put their teeth into a comfortable condition, educating them in proper prophylaxis of the mouth, and have them return at stated intervals for similar treatment. It is obvious that by asking them to return for treatments we admit that the condition has not been cured.—*O. S. Clapperson, Dominion Dental Journal.*

Possible Danger in Use of Emetin

The patient was a woman who received only one-half grain daily during four days, for pyorrhea alveolaris. She developed intense diarrhea with pain and tenesmus. These symptoms cleared up six days after withdrawal of the emetin. The patient was then in a toxic delirious state which lasted one week. These symptoms were quite out of proportion to the moderate dose employed. The particular preparation employed in this second case was, therefore, suspected to be unusually toxic. This suspicion was confirmed by an elaborate experimental research into the toxicity of emetin hydrochlorid preparations obtained from five different commercial sources, in the course of which investigation sixty-two animals were used. The toxic effects manifest themselves in various ways, but in using emetin one must be on the lookout for such danger signals as intense diarrhea, albuminuria, and peripheral neuritis.

—*Archives of Internal Medicine, Oral Hygiene.*

Things We Can't Do

There are thirty-two things that a dentist cannot do. He cannot restore any of the thirty-two teeth of a normal denture if that tooth be lost. He may provide a substitute, but a restoration which means complete duplication of the orginal is forever beyond his realm of accomplishment. To the dentist that is a self-evident axiom. To the patient, it is a considerable shock for he has been accustomed to thinking that a lost tooth can be duplicated at will, almost as a broken lens is replaced by a whole one in his spectacles. But a statement like that to a patient has this result: He becomes anxious to give his support to every effort to restore that tooth that is made by the operator. The patient becomes a co-operator.—*J. O. Lief, Dental Outlook.*

To Roughen a Broach

Fold a carborundum paper disk—medium grit—across center and pinch together while drawing broach between folds. If desired to withdraw cotton from canal with broach, rotate it backward and forward while drawing through disk. If cotton is to be left in canal with dressing draw through disk without rotation; a slight backward turn will free broach and leave treatment. Examine prepared broach with magnifying glass and reason will be apparent.

—*J. T. Search, Dental Review.*

Zonetherapy Anesthesia

During the past twelve months, I have used with considerable success in a number of cases the system of pressure anesthesia, discovered by William H. Fitzgerald, M. D., of Hartford, Connecticut, and named by him Zonetheraphy.

—*B. A. Sears, D. D.S., Hartford, Connecticut, American Dentist.*

Teeth of School Children

We are still under obligations to the members of the Cincinnati Dental Society, especially the oral hygiene committee, for their active and financial support during the fiscal year ending August 31, 1915. Nineteen careful and well-planned inspections were conducted by volunteers of the Cincinnati Dental Society, assisted by the women of the Free Dental Clinic Society. Ten thousand two hundred and eighty-one children were examined, and of this number 8,326, or 81.4 per cent., were found with defective teeth.—*W. T. H. Peters, M.D. Ohio State Medical Journal.*

Handy Sprues

Your old Victrola needles make good sprues and in many cases can be attached to the wax in the mouth.—*J. F. Nelson, The Dental Review.*

Fill or Extract?

In the light of our present knowledge of systemic diseases, are we justified in filling the roots of the molars and those which do not contain straight, single roots? Certainly, until we possess better technic it would be better to extract oftener than we do at the present time.

—*E. S. Talbot, Dental Cosmos.*

Malnutrition and Malocclusion

In my studies on the etiology of malocclusion, I have found that of 134 cases examined, 102 were bottle-fed babies. These cases were all examined at random, but with particular reference to nutrition during the nursing period. Of the reasons given for resorting to bottle-feeding, the one that the child thrived poorly either owing to an insufficiency in the mother's milk or its poor quality, was the most frequent. The length of bottle feeding extended from the second week to about the fourth or fifth year in some cases. In some instances, the observations were made from birth.

These investigations have shown that the percentage of malnutrition is rather high, and occurs at a very early period of life, just during the period of tooth formation and calcification.

—*Milo Hellman, Dental Cosmos.*

To Freshen Gold for Casting

Never use the same gold for casting more than once without cleaning. This can readily be done by making a metal casing for a carbon block to overcome block cracking under heat. Place gold in carbon block and while in molten condition add a mixture of one part of borax to three parts of potassium nitrate. This kept up for a few minutes will render gold in splendid condition for casting and good results can be expected.—*W. D. N. Moore, Dental Review.*

Cast Metal Softer Than Swaged

Castings in the form of plates are softer than rolled and swaged plates of the same thickness and karat; they are not so elastic and tough, and are not homogeneous, as they contain numerous cavities.

To insure strength, castings should be sufficiently thick to provide rigidity, and should show a minimum of porosity.—*L. M. Markham, Dental Cosmos.*

Cavity Lining

Negligence in the use of protective media in deep cavities causes much pulp irritation which is preventable. The preparation is often made deeper than necessary, 1 to 1.5 millimeters being ample for resistance form in most cavities. After removing the deeper decay a cement base should be placed before the metal filling and where there is no cement lining over the pulpal area a cavity varnish should be applied to give protection from thermal changes through the metal and in cementing the inlay from the hydraulic pressure exerted upon the liquid portion of cement. Since it is an established clinical fact that liquid may be forced some distance through dentin, temporary irritation if not permanent injury may result from this cause in deep cavities where the axial and puplal walls have been formed with gutta-percha and removed before cementation.—*C. O. Simpson, Dental Cosmos.*

A Soluble Impression

Many good models have been spoiled by even the skilled worker in plaster of paris, in efforts to remove the impression material. A mix of two parts well dried potato flour and ten parts plaster of paris is said to obviate this entirely. The mix is made with cold water, to which a pinch of salt is added to hasten hardening. After having been assembled, the impression is coated with a prepared silex (water glass) and the cast is poured. After the cast is sufficiently hardened, the impression is dissolved away by boiling water.—*Editorial, Oral Hygiene.*

Rumination in Man

A case is recorded in an "enemy" contemporary of cattle-like rumination in a man. He swallowed his food in large pieces, and some thirty minutes later was in the habit of lying on a sofa and "ruminating" his now partially softened food at leisure. He is said to have developed this habit at school, where, owing to defective teeth, he had been accustomed to bolting his food in lumps.—*British Dental Journal.*

(Note—I was personally acquainted with a man here in Melbourne who had the power of ruminating as long as there was food in the stomach. Despite the closest scrutiny there was never the slightest evidence of any strain or effort in thus producing the swallowed food.

—*E. S. Fischer, L.D.S., D.D.Sc. Australian Journal of Dentistry.*

To Restrict the Flow of Solder

In soldering gold, when it is desired to restrict the flow to a certain area, with a sharp lead pencil draw a line around the area. The solder will not flow past the line.

—*Australian Journal of Dentistry.*

Securing Rubber Dam Clamp on Conically-shaped Teeth

Sandarac varnish applied to a conical tooth will prevent the clamp from slipping.

—*British Dental Journal.*

Some Dental Uses for Guaiacol

According to Professor J. P. Buckley, guaiacol is a phenol derivative obtained by fractional distillation from creosote. It is an antiseptic disinfectant, caustic, and local analgesic. Its action closely resembles that of phenol, but it is less irritating and caustic. This drug is very useful in case of an acute hyperemia of the pulp. When the routine drugs fail to bring relief, a dressing of guaiacol will often stop the pain in a few minutes. As an adjuvant for local anesthetics, this drug is excellent.

In my work for the members of the Expeditionary Force I have been constantly faced with the immediate treatment of putrescent root canals. After the usual Sodium dioxide and H_2O_2 or potassium-sodium method, I have found that a paste composed of guaiacol and oxide of zinc makes as satisfactory a root filling as any I have used

E. S. Fischer, L.D.S., D.D.Sc., in Australian Journal of Dentistry.

DENTISTS' MUTUAL PROTECTIVE ALLIANCE

The First Annual Meeting of the Board of Governors at Louisville

Within the past few months The Dentists' Mutual Protective Alliance has been made a national organization. Its by-laws have been revised, placing the control and conduct of its affairs in a Board of Governors.

This board is made up of two representatives from each state, thereby giving each state, regardless of size or number of dentists, equal voice. There is, however, a requirement that before a state is entitled to representation, it shall have a given number of Alliance members.

The active work of making the Alliance a national organization was commenced in October, 1915. Since that time the campaign has been conducted in Iowa, Minnesota, North and South Dakota, Nebraska, Missouri, Kansas, Oklahoma, Texas, Louisiana, West Virginia, Ohio, Kentucky, and is now being carried on in Michigan.

Practically all of the above states are entitled to representation. The following is a list of the states and their representatives who took part in the first meeting of the Board of Governors, held at Louisville, Kentucky, July 25–28, 1916:

Ohio, George H. Wilson, Cleveland; Edward C. Mills, Columbus. West Virginia, J. W. Parsons, Huntington; L. J. Walker, Grafton; (as alternate for O. W. Burdats, of Wheeling). Indiana, W. G. Downs, Evansville; C. A. Priest, Marion. Kentucky, Wm. F. Walz, Lexington; Ira F. Stephenson, Lexington; (as alternate for Dr. Walz); Edward M. Kettig, Louisville. Illinois, O. L. Frazee, Springfield; M. D. K. Bremner, Chicago. Iowa, F. B. James, Wilton Junction. Minnesota, E. E. Smith, Plainview. Missouri, E. E. Haverstick, St. Louis; (as alternate for E. P. Dameron, St. Louis); Martin Dewey, Kansas City. Nebraska, M. E. Vance, Lincoln; E. H. Bruening, Omaha; (as alternate for A. H. Hipple, Omaha). Oklahoma, B. F. Shobe, Tulsa; L. G. Mitchell, Oklahoma City.

The meeting was called to order Tuesday afternoon, July 25th, and Dr. Edward C. Mills, of Columbus, Ohio, was made chairman. The time of the first session was occupied in organization work, the appointment of committees, and the like.

The more important session was held on the following day, Wednesday, July 26th, at which time Dr. M. D. K. Bremner, president of the Alliance, made his report to the governors, a synopsis of which follows:

> "From the very beginning we have felt that in order to make the organization a success, it must have the confidence of the entire profession. Furthermore, that owing to the vast importance of the work we are doing, it should not be managed by a small body of men from one locality. Therefore, we have at the first opportunity amended our by-laws in such a manner, that the control of the organization has been vested in a board of governors representing the various states. You, the first board of Governors, are now the controlling body of this organization and we shall, therefore, proceed to turn over to you all of the affairs of The Dentists' Mutual Protective Alliance, its assets, liabilities, contracts and all other things which have accumulated during the past two years."

Dr. Bremner then read a detailed financial report, which had been prepared and certified to by a public accountant, showing the receipt and expenditure of all monies, etc. The report showed that during the past year the Alliance has not only met and paid all current expenses, but also that the receipts for the year had been several thousand dollars in excess of the expenditures.

Dr. Bremner called the attention of the governors to the fact that the past year had been largely consumed in arguments on appeals, and hearings pertaining to collateral issues of the main, or parent Taggart case; that these matters had been adjudicated by the Appellate Court in favor of the Alliance, and that as soon as the summer vacation period is over, it is expected that they will proceed with the main case—the case which is to determine the validity of the

Taggart patents; that for this reason the expenses of the coming year will be very much greater than those of the past and that every effort, therefore, will have to be put forth to get new members, in order to meet this expense.

Dr. Bremner explained to the governors that the present case had cost a lot of money and must necessarily cost a great deal more, for the reason that the Alliance cannot afford to take any chances; that it must ransack the country for evidence, follow up every possible clue, no matter how doubtful; that the Alliance cannot afford to try to save money at the expense of jeopardizing the final results. It must get everything which it thinks can be of value, regardless of cost, so that when it is through with the Taggart case, it will be finished for all time.

He gave as an illustration some of the expenses already incurred. He stated that in preparing the defense in the present case, the attorneys for the Alliance had visited more than twenty states and had interviewed more than two hundred persons as to their knowledge of inlays, etc.; that at the trial, in June, 1915, they had more than one hundred and twenty-five persons present, either directly or indirectly as witnesses, whose expenses, railroad fare, etc., were paid by the Alliance. As an example of the cost of the proceeding, he stated that the stenographic report of the June trial was $500.00; that the bill of the Master in Chancery for hearing testimony at three or four places outside Chicago, was $1,000.00; that an inlay which it was thought wise to have removed from the mouth of a man named Finley, of San Francisco, and have sent to Chicago as an exhibit, inasmuch as it was believed to have been cast prior to Dr. Taggart's work, cost $200.00, and legal and other expenses in connection therewith used up an additional $100.00.

Dr. Bremner told the governors in conclusion that they had in their hands the control, direction and destiny of the largest dental protective organization in existence, extending to all of its members all of the benefits and privileges of membership; that the work before them for the next few years was extremely important to the profession and that under their leadership the business side of dentistry should be advanced in fearless, straightforward, American way.

The governors laid down stringent regulations as to the method of handling the money of the Alliance, and also required that the treasurer continue, as in the past, to give bond in favor of the alliance in an amount to be determined by the board of directors from time to time, and proportionate to the amount of money which the Alliance might have in the bank.

Many questions of importance in connection with the work of the Alliance were discussed, and several important committees were appointed, all looking forward to making the Alliance of the greatest possible service to its members. In this connection there was a committee appointed to make recommendations to the governors as to new work which the Alliance might undertake and additional service which it might render to its members. It was felt that a body so large as the Alliance could be of even more benefit than at present to its membership.

By the terms of the by-laws, the officers and board of directors are to be elected by the governors. The result of the election, held in accordance therewith, was as follows:

For president, M. D. K. Bremner; vice-president, T. B. S. Wallace; secretary, F. T. Hays; treasurer, C. L. Lind. For directors, V. P. Cooley, Chicago; L. G. Weinshenker, Chicago; H. C. Newton, Chicago; L. E. Jelinek, Chicago; J. V. Brown, Chicago; C. W. Hall, Milwaukee; T. A. Kimberlin, Indianapolis; L. L. Barber, Toledo; R. E. Volland, Iowa City.

The next annual meeting of the board of governors will be held in New York City, at the time of the meeting of the National Dental Association.

Removing a Broken Needle from a Putrescent Tooth

Whilst syringing a putrescent lower central with a fistulous opening on the gum, I accidentally broke the needle, leaving a piece about one-fourth inch long in the nerve canal. After several futile attempts to remove it, I inserted a dressing of cresolform (Caulk's abscess cure) and sealed the cavity with G. P., intending to try to remove the fragment at another sitting. At the next visit I was saved a lot of trouble, as the piece of needle came away quite easily with the dressing.—*E. R. Bisset, L.D.S.*

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

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REGULAR CONTRIBUTIONS

INTERIOR ARCH CORRECTION

BY FRANCIS E. WILLIAMS, D.D.S., LOS ANGELES, CAL.

Written for The Dental Summary.

THIS MAY BE more or less a new term, wholly so of late years surely, yet there was a time when interior correction was the "whole-word" method and no other known, for interior correction was conceded to be logically correct, the known direction from which force should be applied. In numerous instances which we might cite, methods of accomplishing results were entirely changed. Old methods were dropped over-night, as it were, and the new taken up—a frantic grasp for that which would accomplish better results or the same results by a better method. That is as it should be. It may be what we call progress; at least the results tend to progress when taken as a whole.

Sometimes in these changes we save time or eliminate waste or both, and again we save waste at a sacrifice of time. This goes on every day in all manner of business trades and in the professions, but in the latter we ourselves are dealing with human tissue; thus we should look at the results of our efforts from the patient's standpoint, for we are their servants, rendering them assistance to the best of our ability. They come to us in need or they would have not consulted us; it behooves us, then, to be continually prepared to render them better and still better service in the results obtained by them at our hands.

At our hands the greatest waste is the waste of human tissue and this term may be construed in the sense of injury to the tissue as well as to destroy it.

Harking back to methods and principles; after the many changes in our efforts to get results, how often have we had to revert to our former principles, together with an improvement of methods, having found the first principles correct but crude in method? In this way, having proved ourselves in error, we are the better prepared to correct our method in the pursuit of better results or results in a better or more satisfactory way.

How well I remember in college the preparation of the split-rubber plate and the manufacture of springs for the lateral movement. It was told us that as the arches developed, there was continual expansion both anteriorly and laterly; that as the back teeth developed and wedged their way into position, the circumference of the arch was greater. Thus we could the better assist nature in the obtaining of added growth or a faster growth in some positions of the arch by pressure from within outward, and that this would not interfere with any normal growth, as the outer circumference of the arch was left free for expansion.

The apparatus we made and used was crude, but the principle of the correction was correct, has been correct, is correct today, and will continue so.

Then I saw a case being corrected with a lot of wires and bolts and nuts, the wires, which I learned to call an arch, being fastened to the teeth or anchored in the mouth by attachment to bands clamped to the teeth bolt fashion; and the teeth themselves, which were not banded, were hitched to the heavy wire called arch, by wires (small) wrapped around each tooth, and pressed underneath the gums in the back down on the neck of the tooth, so it would stay on, then twisted around the arch in front and the ends of the wires turned back toward the tooth, so they would not hurt the lips so much (much emphasis on the "much"). Well, of course, these wires would break, but they were pulled out and new ones put in and the teeth brought up with a jerk again—jerked they were continually at each appointment.

The arch recalled to my mind a barrel and a hoop—that the hoop was and is to keep the staves from further expansion, the hoop being in a rounded form in this case, conforming to the shape of the dental arch and encircling the teeth outside, as the hoop does the staves (teeth) in the barrel.

I asked about the chance for the dental arch expanding in its growth, with the hoop (metal arch) encircling it, and was told that the arch, when attached, was of a greater circumference than that of the dental arch on the outer surface of the teeth, thus giving room for tooth movement toward the metal arch. However, I never got that barrel and hoop idea out of my system. Though for a time there did seem to be a cloud on its title, the title today is perfectly good, abstract and all.

After only two years of general practice, I took up orthodontia and used this system exclusively and got some results, as the cuts I reproduce here indicate, and I am getting no better occlusion in my correction now, but do get it in a humane manner.

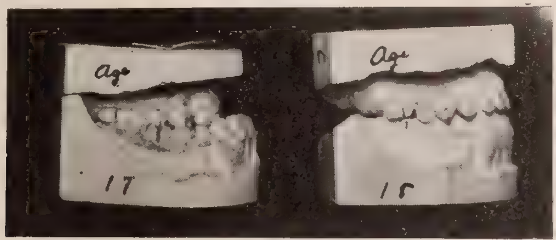


Fig. 1

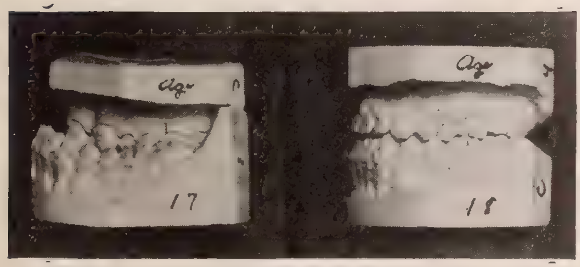
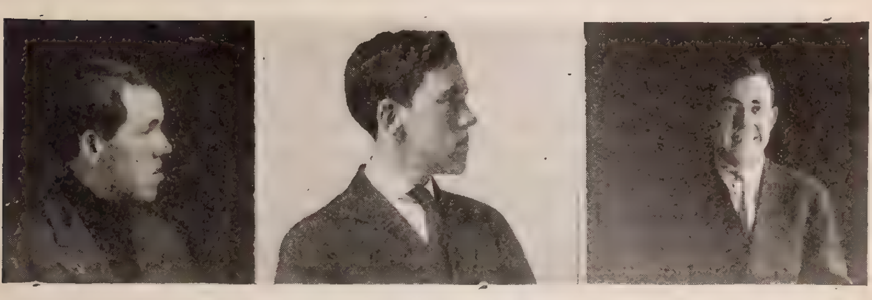


Fig. 2



This young man had the outside appliances taken off and he understands and is comfortable.

Judging from the articles I read in the dental magazines, the case here produced was considered next to or impossible, so in offering this I reproduce a letter (the portion which bears on the case in hand) received by me six years after correction, and most of the time the patient was out of reach of my office, so I was unable to give it my personal attention, and ask you to bear with me when I say that an anterior tooth hits just on edge with the opposite one in closing the teeth. I admit it is a hair's breadth out of position, but reproduce the letter spoken of, to bear me out in attempts at correction in this class of cases, and to assure you final results are satisfactory after retention unless, of course, retention is not sufficient to hold the teeth or patient does not keep retainers on.

> Dr. F. E. Williams, Grand Rapids, Mich., June 16, 1915
> Los Angeles, California.
>
> My dear Doctor:
>
> In reply to yours of June 10th, will say (in regard to my teeth) that they are in fine shape now and have settled all they are going to now, I think. They all bite over except one tooth and that is the left central incisor, which bites directly on top of the one under it. *The back teeth lock perfectly* and I can eat horeshoe nails; never have any stomach trouble. (Signed) E. Brandt Walker.
>
> Note: This case had pronounced stomach trouble.

This case, I believe, is proof sufficient of the satisfaction of difficult cases corrected and also that age has no bearing on correction except that it is a more difficult case and takes longer. A case can be corrected satisfactorily as long as tissue is replaced, as long as a bone will knit (new granulations). My cases bear me out in this statement. However, these cases reflect adversely on the profession—that a broader teaching has not resulted from our efforts, orthodontia, viz: preventive dentistry.

In 1910, two years after the publication in The Summary of this case here given, an article of Dr. Wayne Babcock, of Philadelphia, was published (in The Summary), stating that these extreme cases of lower protrusion were impossible to correct and resection was the only resort.

Dr. Babcock could not have read The Summary, as the case I have given is more difficult of correction than the one he offered as an example of the impossible.

An article in this month's *Oral Hygiene* by Dr. Canning, of Denver, states that extraction is indicated in many cases as a quick and satisfactory way of securing results and permanency. This does not find favor with me. I refer you to example above (corrected case). It may be the easier way, but I do not believe it is a satisfactory way. I have seen in late years spaces opening up where extraction was resorted to (first biscuspid). In the worst type of cases extraction would avail us nothing but disappointment, while the shifting of occlusion has given a wonderful result, separated from a mere better looking set of teeth by a world of difference (perfect development); and quoting from the letter received by me, it will appear as convincing that the mesio-distal relation of the two jaws is correct, after all this time, while the mastication certainly is all that could be desired.

Personally, I feel that the question of adult difficult correction is satisfactorily settled for all time, and though a hard and fast rule cannot be fixed, we are not giving the patients the best in us if we do not give them the benefit of the general correction, always lamenting the fact of treatment having been delayed.

It may not be amiss here to say that it has been and is the custom to extract too much; it is a cure-all which should be avoided; a disease in all phases of the dental profession, once acquired, is hard to control, and practiced at the hands of the inefficient, is a covering of the knowledge of lack of ability.

It is a fact we cannot control—the actions of all our patients. This has a bearing on the success of operations at our hands, but even considering that, our efforts should be universally successful.

I might add here that should the case illustrated in this article seem to lack any in the question of age, (which I judge it cannot), or in abnormality and difficulty of correction, I am prepared to offer a case corrected many years older and any number of times more difficult of correction.

My results are no better than before, but the treatment now is the least painful, least irritating to the tissues, it is possible to conceive.

Did anyone ever hear of patients having their teeth corrected with the appliances on the outside, who were comfortable? Surely not.

Or were they so mentally dead from shock when they saw what they were to wear on their teeth or after being subjected to (some of) the wearing, that they were unable to offer further protest?

If experience is the sad and all-efficient teacher, surely we who have seen more and have done more of the correction after this severe method, can the better appreciate the fortitude and bravery with which patients submitted to the correction of their cases.

They were able to stand it, of course, and did and do stand it, and consented to the correction, but only because they thought there was no other way, which was mostly so.

I believe I corrected the cases with as little pain and distress as was possible with the method used and with as much success (as the results I achieved would seem to prove). When I draw my conclusions from my own practice, I believe they are not different materially from those which might be drawn from any other like practice, and the evolution which my practice has gone through would seem to bear me out in my efforts to give the patients the same results at our hands, with a less degree of discomfort—let us say, instead of pain, thereby giving to the method discarded the measure of credit it should have, which really was considerable and, though *mechanically wrong*, was a start; gave us something to work from and did get results; it was a system; it was a method; hence far superior to indifferent individual effort because of its training of specialists devoting their efforts to the success of this line of work, which formerly had not been so.

When Dr. Edward Canning was in my office last year on his way to San Francisco to the meeting, and explained his method to me and showed me the appliance used, I immediately told him I believed, as far as exterior correction was concerned, his appliance was so much superior to any heretofore made that there was not a chance left for a choice, because it must be used (Canning's appliance), but that exterior correction was wrong; it was out-classed and would have to go; that further correction must be from the inside of arch. The patient would demand it.

Interior correction, besides being the easiest and simplest in the more difficult cases, is as well the simplest in the easier cases and works hand in hand with preventive orthodontia.

Above I mentioned a term "mechanically wrong." Think of that term! mechanically wrong. Is that not correct? Think in what direction the natural course in the development of the arches is exerted—outward, of course. Then that which we should do is to assist nature, which is unable, from whatsoever reason, to accomplish the normal result of development; movement from within outward.

That assistance to nature should be to work along the natural line as much as possible. Would that be to hitch to the tooth from in front and draw it and outraged nature with it? Or pressure from within, outwards on the enamel surface of the teeth, the application of pressure to the surface of enamel on a tooth depending upon the exact degree, direction of movement, the tooth must pursue to normal position?

This term "mechanically wrong" is not a coined phrase of mine, as it was spoken by the father of a boy who was here in my office making arrangements to have his son's teeth corrected. He said he was a mechanical engineer and that my method was right mechanically (I had showed him from the models I had, the two methods of procedure), to give him a better idea of the difference of the two methods from the patient's standpoint. He said he could sit down and draw the method of procedure in the progress, on paper, and mechanically depict the results, because the mechanical principle was right to start on, by the method I advocate, and was wrong in the other method.

And the anchor band, clamped on to the tooth like a bolt, and just as easy and good-looking, especially when bolted from the inside!

Could a contraption for the torture of the mouth be more surely perfected, which it was possible to wear in the mouth at all? It is a wonder mastication and speech could be induced while wearing those anchor bands, but the patient lived.

What a wonderful field for the retention of food products, causing the recession of the gums, which, as the first molar is the first permanent tooth to erupt, it is then of longer residence in the mouth, hence subject to the longest period of irritation from retained food products.

Upon removal of the anchor band, the tissue is loosened from the tooth so that an instrument may be run a very considerable distance along the root of the tooth underneath the loosened gums.

The *band* and *spur* used in the rotation of teeth furnishes a point protruding from the band directly into the mouth, making the tongue sore from contact with it, in tongue movements.

In the 1913 September SUMMARY, under the title "Some Suggestions in Orthodontia", the subject was discussed by me and improvement shown, with the result that the bands all presented a smooth surface in the mouth, devoid of scarcely any protrusion and always comfortable for the patient to wear, forming no surface for the retention of food products.

For ten years I have not used one of the old irritating, impossible, inhuman bands. How could we, when the improvement furnishes a band comfortable to wear, eminently satisfactory from the patient's standpoint? Nor is it so much trouble to the operator in manufacturing it; consuming less time. It is more practical, consuming no more time in the placing under pressure for rotation of tooth and requires less distinctive operations in making.

The *arch*. The "hoop around the barrel." Irritation from anchor bands is considerable, but the arch has the added feature that it is plainly visible and always is subject to an unsightly and awkward appearance, to say the least. The manner of its attachment serves as a further irritant and retainer of food, always in the best position to catch the cheek in the closing of the mouth and the end of the arch or tube irritates the cheek, in spite of the careful attention to adjustment. A first-class food catcher and the retainer of the same par excellence, only equaled by the inside bolted anchor band mentioned.

Many of the cases needing correction have the anterior protruding teeth, hence the shortened lip, as it were, rolled up because of the position of the protruding teeth, and further held up because of the arch surrounding the teeth in exterior correction. Correction should include the gradual resumption of the lip of its normal position—impossible with the arch projecting at least the distance of its diameter further than the most protruding tooth, further retarding the lip, rolling it still further away from normal, upwards and outwards, making a bad condition worse. The lips, in consequence, stand further apart, aggravating the condition, in each case producing a sight more disgusting in its bungling appearance (no matter how painstaking the adjustment in arch preparation), and in each case making it impossible for the patient to reasonably clean the teeth, as much on account of attachments to the arch (ligatures or band and wire attachment to arch) as the arch itself.

NUMEROUS LIGATURES WIRE AND METAL ATTACHMENTS

The wire ligatures attaching the different teeth to the arch are impossible at any time. This is true, it matters not of what material the ligature is made. If they are fastened around the tooth without a supporting band to hold the same in position (and the greatest amount of correction is made without this support), then the ligatures must be carried below the gum to the neck of the tooth or it is generally impossible to retain them in position.

Imagine these ligatures impinging on the attachment of the gums to the teeth (the dental fibres) in the pressure required for tooth movement! This pressure is exerted constantly toward the apical end of the tooth, as the root tapers rapidly toward the apex. The pressure causes the mucous membrane to become loosened from the neck of the tooth, because nature tries to get away from the irritation.

The ligatures corrode and become foul, in the best position to cause the most danger to the tooth and soft tissue.

Is it any wonder that the impression has seemed to become general that the teeth in their correction are considerably injured? With the terrible-looking appliances, it is a serious question whether to consent to the correction or not and the only possible reason for consenting to the correction and using these methods advocated, is because of the fact that they thought there was no other way.

Where the teeth are all banded, using wire attachment to the arch or the ligature, irritation around the gums is removed, but the arch and anchor bands spoken of in the exterior correction remain, and the wire connection from the bands to the arch or ligatures to arch is the only link needed in the completion of the net-work of apparatus worn on the teeth, to make the field for retention of food products perfect, and the bulk of material to keep the lips from assuming a normal position, requiring greater effort to close the lips, instead of a lessened effort, tending to the result that the lips will remain closed when in a position of rest and requiring an effort to open them, as in the normal.

Using points brought out in conversation with patients as a basis for improvements has resulted in the change of method and working, from time to time, in trying to make it easier for the patient, and to get satisfactory results by simpler methods, at the same time making the appliance look better. I have constantly kept in mind these objections and complaints of my patients and tried to overcome them, because it must be admitted that it is—at least as they see it—from the standpoint of looks and comfort; which means considerable to them.

That is the reason I threw away the old clamp anchor band twelve years ago, and the band and spur for tortion of teeth followed it ten years ago, and the wire ligature or thread (silk) three years ago, and the exterior arch mostly four years, and wholly two years, ago; after which I confined my practice to interior correction and never will correct another case using the exterior correction method.

From what my patients say, I never will be asked to; I never am, after they see a comparison of the two methods which are shown them on models and they recall the looks of cases they have seen being corrected. The time will come, and I believe soon, when no one will submit to exterior correction. Common sense will not dictate or allow it. Interior correction allows smaller-gauge wires to be used, never larger than eighteen gauge and seldom larger than nineteen.

There is perhaps only one condition of irregularity which might be a severe test upon the logic of interior correction and that test only strengthens the confidence placed in the method at the start. Upon this class of cases I shall dwell briefly.

The jack-screw I never used and now never use a threaded wire or nut.

In cases where the anterior teeth (lower) bite too far up and in many cases so far that they bite against the membrane of the palate, they need not interfere with interior correction, as strong pressure is exerted against the incisors (lower), pressing them back in the process to normal position, from which they elongated because encountering no opposition (occlusion); in principle the same as happened with a tooth in one jaw when the opposing of the other jaw has been extracted; the tooth not meeting with opposition many times elongates, moving out of the process, until wedged in approximate mesio-distal occlusion, with the teeth in the opposing arch, which have moved together somewhat, thus reducing the "distance" between them, occupied by the lost tooth.

Face view showing lower under full movement. Fig. 4.
General expansion—Portion of anterior teeth and second bicuspids. Teeth anterior to second bicuspids all being moved forward to make room for second bicuspids which are in lingual eruption.

Face view showing arches under full movement. Fig. 5.
Nothing showing except bands for interior correction attachment, which, as has been shown is not bunglesome like the outside appliances.

Face view showing upper arch under full expansion movement and rotation of teeth. Fig. 6.

Here let me emphasize the necessity of these teeth being forced back into the process and into their correct position before bridges are made, or, better still, when a tooth is lost, retain the space. Extractionists should so advise patients. The pressure, while downward on the anterior teeth, is upward on the posterior teeth. This principle in the correction differs not at all from exterior correction.

In this class of cases the fact of the lower elongation is our proof positive that there is no occlusion between the incisors, and so we have plenty of room for the appliance without it touching the gums; and where the lower incisor bite is more forward, just back of the upper incisors, caused by the shape of the arch, it is an advantage to the movement rather than a detriment, because the incisors are securely fastened to the arch, held by pliable spurs which surround the arch (keeping pressure off the gums), soldered to the band, making a fastening strong and rigid, still subject to adjustment, and making a rigid surface to bite against (anterior teeth) and helping depress the incisors.

In these cases just cited (as stated above) is, logically, the most severe test of the method of correction advocated, which the method easily stands.

I have yet to find a case where it is not easily possible to attach the interior arch for correction—either of them.

In the upper protruding cases as well, it works with ease and precision; the pressure is exerted along normal lines at all times and continuously.

The length of time necessary for correction is considerably shortened, as movement may be faster because of the little pain from pressure of tooth movement, while the mental attitude of the patient, which always has an important bearing on the case, is the most that could be wished for.

Interior correction assures a cleaner, healthier mouth, the action of the tongue with the help of the secretions of the mouth is a wonderful help in keeping the mouth clean, the appliances clean and bright.

In interior correction the appliance in making is more broken up, insuring more rapid and easier changes.

These notes are not a discussion of detail, which will be taken up in another article, as this one is already too long, but correction from the patient's point of view, with ourselves as operator, following a method which is logically, mechanically right. A comparison of the case under correction will help you to see how the patient looks at it. Look at the case here presented and then think of any cases being corrected that you know of, and your conclusions can not be far wrong.

> The difference between hurrah and hustle is the difference between the new broom and the vacuum cleaner. One makes an impression for a few days, but the other grinds along and gets clear down into the roots of things day after day. There is always a reaction after a hurrah. There is no slipping back after hustling because—like a commodity mentioned in the Sunday school books—it brings its own reward.—*Joseph Blethen.*

SUPPLEE TECHNIC FOR TAKING IMPRESSIONS WITH THE MOUTH CLOSED AND UNDER NORMAL BITING STRESS*

BY E. R. KIBLER, D.D.S., INDIANAPOLIS, IND.

AS THE TIME ALLOWED for this paper is necessarily limited, and as this subject is so broad, I am going to try and make the paper as practical as possible and give you as little theory as feasible, confining same to Mr. Supplee's technic for a full upper and lower with the hard and soft ridge. I am sure those of us who have been using this method will agree with Mr. Supplee when he says, "Up to the present time the average dentist has been led to believe that plaster is the best material to use in taking a full upper or lower impression; and when an apparently good impression has been taken, and a plate made from it does not fit, the blame should be laid to the fault of the vulcanizer or in some stage of the procedure following the impression.

"A few moments of careful thought in the proper direction will convince you that both the plaster impression and the present method of taking it are decidedly wrong, as well as the idea that an air-chamber in the centre of a plate is essential to secure a plate that will hold against the strain of mastication.

"Many years' experience in making successful plates for patients who have had from one to twenty-five or more failures has taught me that I have no use for plaster in any case where I expect a plate to be retained by so-called suction, or where I have to deal with soft and movable tissue

"The greatest comfort in a plate can only be obtained when you have equalized bearing on the soft and hard tissues while in their working positions, hence this equalizing must be done in the impression with the *mouth closed and under normal biting stress;* and, in order that there may be no doubt about the finished product, the so-called impression must be the exact model of the proposed plate so far as height of rim, thickness of edges and length of plate in the rear are concerned.

"These features cannot be secured by the use of plaster, owing to the fact that when the mouth is opened, the muscles of the cheek and soft palate are all out of the normal position, and it is impossible to scrape the model to properly allow for the position they will take when relaxed.

"Practically all plates made from plaster impression with the mouth open have spaces all around the rim, which were made by the muscles in their distended position. The buccal and labial borders of the plate being thinner and smaller, do not rest on the muscles or tissues in their relaxed or mouth-closed positions.

"For this reason, plates tested to see if they fit when the mouth is open seem to stick like grim death; yet the patient will tell you that he cannot use them to eat or even talk with. It is then you generally blame all the troubles to the fault of the patient, etc.

---

*Presented at the Indiana State Dental Society, 1916.

"The difference is due to the fact that when the mouth is open, the muscles are drawn tightly over the edge of the plate, and the soft tissues are dilated, thus sealing the edges when the mouth is in this position. Your patient uses the plate with the mouth closed, when the tissues are in an entirely different position.

MUSCLES OF THE LOWER JAW WILL STEADY PLATE

"By making the edges of the plate conform accurately to the muscles when in their natural working position, you have secured one of the essentials necessary to comfort in lower plate, viz: should the plate be dislodged from its correct position, the action of the muscles of the tongue and cheek will automatically carry it back to place without any effort on the part of the wearer.

"As many lower ridges are almost completely covered with loose tissue and free-moving muscles, it is also very important to get an impression of these muscles under normal biting stress so that they will all be under equal tension when in use.

EQUALIZATION UNDER BITING STRESS ESSENTIAL

"The most successful denture is the one that fits best when in actual use; and as every mouth contains hard and soft parts, many of which are materially changed by the movements of the cheeks and sub-lingual muscles, it is therefore necessary to equalize the pressure on these tissues to conform to the natural stress applied by the patient.

"The pressure applied by the human jaw varies from fifteen to two-hundred and fifty pounds; and with this wide range it is very important that an impression should be taken under the stress that is characteristic of the individual. This stress varies according to the relative position of the jaw, and to get the greatest use from a plate, these conditions must be carefully considered.

NAUSEA ELIMINATED

"The fact that a patient gags when a plate is in the mouth, does not mean that you should shorten the plate, as many think, but that it should be lengthened until the edge of the plate can be imbedded in the soft tissue, or if necessary in the soft palate so that the tissue will be drawn taut over the edge of the plate.

"The tickling sensation caused by the soft tissues vibrating under the edge of the plate is the cause of most all of the trouble of nausea, or so-called gagging. If you will trace some compound across the back of any plate, and have the patient close and force it up into the soft tissues, you will rid the patient of this tickling sensation.

"This lack of fit across the vault in the rear is due to the fact that when the mouth is open the soft palate is dilated or drawn down, and naturally pulls or changes the position of all the soft tissues that precede the soft palate. Hence, when an impression is taken with the mouth open, you secure a false impression, which will fit the mouth only when it is open. As soon as the mouth is closed, these tissues are relaxed and your plate does not fit to the tissues when in actual use either in talking or masticating.

HOW TO USE MUSCLES TO HOLD A PLATE

"The fact that muscles have been the cause of throwing the average plate has been accepted by all as the 'fly in the ointment,' and the only remedy was to cut down the plate till it clears them, thus eliminating all bearing outside the ridge.

"A few moments of careful thought in the right direction will convince you that these co-called muscles can be of great value to you in holding a plate up rather than throwing it down, if you will take an impression of them in the right position.

"To make this statement more clear, I will explain that the muscular attachments of the cheek and lips have three distinct positions.

"When the mouth is open wide, they are in the rear position and take the form of little cords.

"When the lips are reached forward, as in whistling or taking food into the mouth, they are in their forward position and spread out like an opened fan.

"When the mouth is closed to normal rest, they are in what may be termed the middle position, when they cease to appear as muscles in the real sense of the word, and are really only cheek attachments or soft tissue which can be changed by the movements of cheek and lips.

"Now, the average impression being taken with the mouth open, and the plate made to conform to this position, it will fit when the mouth is open, but as soon as the patient closes, these tissues move forward and have a tendency to carry the plate forward, which, as you know, is the easiest way to take a plate out of the mouth.

"Now, if you take an impression of the mouth closed, the plate will fit when it is in the position in which it is to be used, and when the mouth is open the muscles will want to travel toward the rear, and in so doing will attempt to carry the plate with them, but cannot carry it any further than the ridge in front will permit, and as a result will draw over the edge of the plate and automatically seal it, so that the wider the mouth is opened, the tighter the plate will fit.

"When these muscles are taken in their correct position, they can be compressed so as to equalize the pressure on the hard and soft tissue when under normal biting strain, and add another valuable asset to the comfort of a plate, viz: eliminate leverage, making it possible to set teeth outside of the ridge if desirable, and yet the patient cannot throw the plate by biting on the front or side.

PRINCIPLES REVERSED IN THE LOWER

"In dealing with the lower, we are obliged to reverse the principles applied to the upper, and conform the edge of the plate to the muscles when in their distended position, which is their natural working position. To thoroughly understand this, we must take into consideration that the tongue when in use during mastication, talking and swallowing, is continually being pressed against the roof of the mouth. None of the above motions materially affect the muscles attached to the outside of the ridge, as these muscles are in action when the mouth is opened, or in laughing, etc.

"Both lingual and buccal muscles are in motion when talking; hence, you will readily appreciate that in order to get an impression that will relieve, or rather conform to them when in normal working position, we are obliged to take the impression of the lingual muscles with the jaw closed and with the tongue to the roof of the mouth, and to get the maximum distended positions of the labial muscles, the mouth must be opened as widely as possible or the equivalent.

"The masseters are in action when biting pressure is applied. To make a perfectly comfortable lower denture I must secure equal pressure on the muscles or tissues when in their distended or working position.

"The average impression being taken with the mouth open, drives the tongue down into the floor of the mouth and spreads the cheek muscles out of their normal position; hence, your finished denture will fit only on the top of the ridge."

DIAGNOSIS OF THE CASE

It is essential that we diagnose our case properly before attempting to take an impression. It is just as important to get a correct diagnosis in prosthetic dentistry as it is in any other operation. We should examine the mouth with the index finger for the hard and soft spots and the movable portion of the soft ridge, the location and strength of the muscular attachments, the space between the tuberosities and the coronoid process.

"If the entire vault and ridges are extremely hard and flat and the muscles attached close to the top of the ridge, it is advisable to make a rubber plate for the patient to wear for at least a year or so, until the action of the rubber causes the tissues to become softer, at which time a metal plate may be made with better results. If the mouth has a tendency to soft ridges, with excess amount of soft tissues in the vault, it is wise to advise the patient to have a metal plate. A temporary gold-lined plate should be made, and have the patient wear it for a year or so to reduce the inflammation before making a metal plate.

"It is well to go into the history of the case in hand before making any promises, for the question of muscle-strain and muscular development will play a prominent part, in view of the fact that we are going to use the muscles to hold the plates in their proper position. If the patient has been chewing for a number of years on a few teeth, with the jaw abnormally closed, or on one side only, or has gone without teeth entirely, we cannot expect to open the bite and place the jaws in the correct position, expecting them to be fully efficient and remain the same, until they have fully developed to work in their new relations positions. This development should be accomplished in stages if we expect to give our patient the comfortable use of the plates during the developmental period. Ignorance on this subject has been the cause of considerable loss in the average dental practice, inasmuch as many dentists have made two or more sets of plates for patients, carrying them through this developmental period before securing permanent results, yet only receiving a fee for one set and ending with a dissatisfied patient. If we had properly diagnosed our case in the first place, and explained to the patient that we would have to regulate the muscles and tissues the same as an orthodontist regulates teeth, we could have received a fee for every denture and at the same time held the patient.

"After we have decided what we are going to do, the next thing is to select our impression tray.

THE REQUIREMENTS OF AN IMPRESSION TRAY

"*First:* The tray must fit the vault exactly at the rear and the buccal and labial border of the ridge approximately, with one-eighth of an inch leeway on each side.

"*Second:* Must be one-eighth of an inch short of the buccal and labial muscular attachments.

"*Third:* When the ridge is hard in front, exact length of proposed plate or within one-sixteenth of an inch of the vibrating soft plate.

"*Fourth:* Soft ridge in front, within one-eighth inch or less of the full length of plate-to-be.

"*Fifth:* If the patient is subject to nausea, the rear edge of the tray must be imbedded sufficiently hard to eliminate vibration of the soft tissues. The tray should be the exact length of the plate-to-be.

"The lower impression tray should be cut short enough so that it ends within one-eighth inch longer than the region of the second molar."

Before proceeding with the impression, we should educate our patient as to what we will expect of him in the new procedure. I generally explain that it is fifty per cent. dentist and fifty per cent. patient. We can prepare the compound and get it into the mouth, and then it is up to the patient to do what we tell him. Get him to go through the facial movements, forward as in whistling, and backward as in laughing. Let him practice with you beforehand and see that he can do this, because you will find if the patient has been without properly constructed dentures for a great number of years, he has lost certain movements of the muscles, and you may have some difficulty in getting him to do as you wish; also, be sure that your patient is sitting upright in the chair and in an unstrained position. You can readily see that if the head is tilted backward and in a strained position it is impossible to give the face movements or close the jaws accurately.

WATER HEATER

Mr. Supplee has devised a water heater for heating modeling compound to be used in taking these impressions. I find that this heater is indispensable, and he described the same as follows:

"The apparatus consists of an electric unit suspended in the surface water of a pan. The winding of this electric unit is such that it is capable of creating three distinct heats. By turning it on full, it will bring the water to a boil, and when the surface is boiling, the bottom will still be below 130°.

"By stirring the water in the entire pan up, it will create a uniform temperature of about 160°. By turning the switch off to low, it will maintain the surface to 160° and the bottom will cool off till it is at or below 140°. A gas unit is suspended in the same way, being controlled by a thermostat. Now, what does this mean to us?

"If modeling compound lies in water of not over 150° for ten minutes or more, it will lose some of its stickiness and at the same time work more smoothly.

"The modeling compound most adaptable for our work should be in its best working condition for inserting into the mouth when heated in water 160°.

"Compound can lie in water of 140° temperature for eight to ten hours without spoiling, but it will deteriorate materially if left for an hour in water of 160° or over. If put in boiling water, it will be spoiled in about two minutes.

"Hence we can let our compound lie in the cold water in the bottom of the pan, and when we need it we can reach in with a glass spatula and get the amount we want and mold it in the hot surface-water ready to insert into the mouth.

"Our heating apparatus is of great value as a reducer of temperature, for in many instances we are compelled to heat the compound over a direct flame and to a temperature far beyond the scalding point. Yet by dipping it in the surface water of our pan we will reduce the temperature of the compound so that we can pass it directly into the mouth without the least danger of burning, and with the positive assurance that it is at the right molding temperature."

SELECTION OF TRAYS

The trays most advisable for this work are those designed by Mr. Supplee. I mention this because many have purchased other trays through error, thinking they were getting Mr. Supplee's.

These trays have reversible handles conveniently attached under the tray, which can be used as a holder for the biting block as well as a handle.

The Greene trays can also be used, but not being designed for this special technic, are lacking in the essentials.

"The essentials of an upper impression are mouth closed and muscles in the middle position. Compress muscles in relaxed position. Relief of all hard spots. Equalize pressure on hard and soft tissues and seal back of tuberosities when the mouth is closed."

HARD RIDGE IN FRONT

We are now ready for our impression. Dry tray and form compound in a ball about size of a walnut. Hold one side in flame until it flows. Then stick this portion on tray and spread so that the heated part is next to tray. Hold in the hand and place each thumb on each side of the ball of compound, and press downward from the center. Throw up rim around the tray to the region of the first molar. Then pinch up a little mound of compound in the center, leaving the rear of the vault free. Heat this little mound over the flame, allowing the flame to glance off the mound, and heat the sides and rims of the compound. Do this slowly, and allow the heat to penetrate. Dip entire impression material (but do not get the tray in the water), in hot water at a temperature of 160°. This will temper the compound and will not burn the patient. With the left arm around the head of the patient, hold lip up, insert impression sidewise and rotate same, and center over ridge, push impression upward and backward with index finger in the rear third. Press up to place with a wave-like motion, having the patient give the facial movements. Be sure and have the patient give the facial movements while you are gently pushing to place. Do not push to place and then have the patient give the facial movements. Allow to cool for two minutes. If you have an assistant, allow him to throw ice water in the mouth with a Spooner quick-filling syringe. This basic impression is very important, and at this stage we should take our time and allow to thoroughly cool before removing. Remove, trim to proper thickness. Bend away tray in rear and return to mouth and test for rocking by lateral pressure. First on one side in the bicuspid region and then the other. If the impression does not rock, you are ready for the next stage. If the basis impression rocks, you want to run your water heater to 170°, and with your Spooner syringe flow the hot water over the impression, allowing the water to run off the heel. Return to mouth, press to place and cool. If the rock is not out, repeat operation. As a rule you will correct the rock by performing this operation twice. Dry off the impression tray, turn handles out. Take roll of compound and lay on the back of the impression tray. Bring your handles around and tuck compound under them which will help to hold it. Shape up with the fingers; pass compound over the flame; dip in the water and return to mouth. With the occlusal-plane paddle, insert in the mouth and bring up until the handle of the paddle is parallel with an imaginary line drawn from the lower border of the external auditory meatus to the ala of the nose. Remove from the mouth, take paddle off the occlusal plane; this represents the plane which is the equivalent to the position the tips of the occluding teeth assume when the mouth is closed normally. Dip in your ice water and trim up the excess. Return to mouth. If this operation is correctly done, it will give you the correct length of your teeth and the occlusal plane. With upper impression in the mouth, allow the patient to bring the lips together and swallow and hold. Then pull down the lower lip and note the distance between the occlusal plane and the ridge below. This will give you an idea of how much compound to use for your lower impression. We are now ready for the lower impression.

Select the tray; adjust the handle. Be sure the impression tray is dry and short enough; should extend slightly beyond the second molar. The water at this stage should be 170°. Roll the approximate amount of material between the two hands until it is the length of the plate-to-be. Then dip into cold water quickly and dry. This will chill the surface. Then bend to the form of the tray. Pass the surface of compound that is to go next to the tray through flame until it flows, then quickly stick it all around to the inside of the tray. Then dip tray in cold water. This will chill the surface of the compound next to the tray and will prevent compound from flowing over the occlusal plane, also will give you three degrees of temperature in compound. That next to the tray will be hard, the middle will be medium soft, and the portion that will come in contact with the lower ridge will be the temperature of the hot water. Then reverse and hold the face of your compound in hot water until it is just soft enough that you can work out in approximate shape for proposed impression. Be sure that the impression is shaped so that it will strike the sides of the ridge first and flow toward the center, and that you have more material in the region of the ten fronts than in the molar regions. If you have more compound in the molar regions than you have in the incisor region, it will cause the patient to throw the jaw forward. Pass the impression over the flame and flow compound; then hold in the surface of the hot water to equalize heat; then step in front of the patient with the upper impression in place, and quickly pass lower impression into the mouth. Pull the impression forward and allow it to rest on the inside of the lower lip; then ask the patient to bring the lips together and swallow. That will automatically take the impression and give you the bite at the same time. Allow to harden for three minutes; then with your water syringe flood the mouth with ice water, with your saliva ejector drawing the water out. Be sure that your impression is absolutely hard, so that you will not distort impression in removing. Remove from mouth, dip in cold water and allow to remain a few seconds, then take out and trim the impression. Return to mouth and test impression by trying to rock it with pressure one side then the other, in the bicuspid region. If the impression does not rock and does not bob up and down while the patient opens and closes the mouth, you are ready to take the next step.

At this time we should find out whether we have a true bite or not. The way to find this out is to have the patient close the jaws quickly with a snap and listen to the sound, whether it is clean-cut or whether there are two sounds, a strike and a slide. If you decide there is a strike and a slide, warm the occlusal plane of the upper all around one-eighth of an inch deep and return to mouth with the lower in place. Have the patient bring the lips together and swallow. If the occlusal plane has passed through more material on one side than the other, this proves that the patient is biting under muscle strain. In other words the mandible is tilted slightly or the baseplates have been shifted, due to unequal pressure over the hard and soft areas in the mouth. What we want to do now is to straighten it up. Cut the occlusal plane until it is flat. In other words, remove all indentations. Then cut down the side that passes through the most material, the thickness of a cardboard or more; then warm the entire surface again and return to mouth and have patient bring lips together and swallow. The chances now are, that the occlusal plane of the lower will pass through the same amount of material in the upper plane. If you should close the jaws too much in correcting the bite, take a small roll of compound and put over the occlusal plane of the upper, and return impression to the mouth, having the patient bring the lips together and swallow. This will open your bite again. We are now ready to proceed with our impressions. We are going to take these impressions under biting stress.

We will now adjust our lower impression in the masseter region. Cut away the impression in the region of the molars. Cut off all surplus that has been drawn up by the action of the cheek and tongue, and reduce it to the approximate fulness of the plate-to-be, as far as the cheek and tongue are concerned. Now cut off the impression at buccal and labial side in the molar region as far forward as the second bicuspid, being very careful to cut entirely too much rather than too little. Pass both surfaces that have been cut over the flame to gloss the same, then quickly take a pinch of soft compound from heater and lay it on the ends that have been cut away and shape same to fit the ridge. Hold over the flame and flow same, flowing compound forward to where you added it. Dip in the hot water and return to mouth. Locate the impression over the ridge and press down gently into place in the region of the ten fronts; then ask the patient to bring the lips together and swallow and close firmly, giving the face movements.

If you had enough compound, you have now conformed your impression to the masseter muscles in their various working positions under biting stress. When the compound has passed from the flowing stage to the molding stage you should gently pull the cheeks upward so as to relax same, if they have been over-strained. Allow to cool, then flood mouth with ice water. When the impression is hard you can test the same for rocking. If it does rock and will not stay down when the patient talks, you should warm the lingual surface of the impression in the molar and biscupid regions and return to mouth, having the patient bring the lips together and swallow. The lingual attachments after having been over-strained will turn up your compound and give you an unstrained impression of the lingual attachments. It is very readily seen that we can over-strain our muscles and tissues by having our compound too hard, therefore it is essential that we have our compound in a flowing state when taking these impressions. We are now ready to proceed to finish the upper.

FINISHING THE UPPER

Cut down the buccal and labial rim of our basic impression until it is entirely too short. Then hold over the tip of the flame and gloss the surface that has been cut; then pick up a small piece of compound and roll between the fingers and dip in the water again to warm it; then pass the roll over the flame and lay on the impression where we cut away the rim and pinch too high; then heat this portion over the tip of the flame, allowing to strike on the inside; then dip the entire front portion into the hot water and insert in the mouth. Locate it over the ridge and make sure that the impression is practically seated in front, and then let the patient bite the impression into place; then hold the jaw firm while giving the face movements; then after compound has set for one minute, give a slight massage forward and inward very gently, being sure that you do not do this until the compound has passed from the flowing stage to the molding stage, because if you do this procedure when the compound is flowing, you will cause the same to squeeze up on the buccal and labial attachments and cause a temporary fit. The reason you want to do this is that the forward and backward movements have caused the compound to be pushed out, and the idea is simply to mold it back gently to place against the attachments. In following these steps we have muscle-trimmed the impression so that the rim is the proper height, and made it possible for the muscles to relax. In other words, we have compressed these muscles in their relaxed position, and have done all this with the mouth closed and under biting stress. You should test the plate for rocking from side to side. If your impression should rock at this stage, you should correct it as I told you when taking the basic impression. We will now correct the rear third of the vault.

CORRECTING THE REAR THIRD

First examine the vault and refresh in your memory the condition of the tissues and how far forward they extend. We know that they were all stretched out of their normal position when we took the basic impression with the mouth open, so we must now correct same with the mouth closed. That is the reason that a denture will not fit properly when made from an impression with the mouth open. We must cause this material that we are going to add in the rear third of the vault to flow toward the rear, so that it will carry this soft and movable tissue with it, and not confine it under the plate, so that when the mouth is open it will draw the tissue out from under the plate, and then when it is closed will relax same, causing it to try and get under the plate again, therefore producing an uncomfortableness and many times causing the plate to be dislodged.

Take your tracing stick and trace compound across the rear of vault, so as to more than fill up the space that we know exists there. Be sure to add it too far forward and very lightly, directly across the rear edge; then hold over flame and warm entire rear of the impression. Be sure to warm forward of where we added the compound, allowing the flame to glance toward the rear, and be careful not to warm the forward part of the impression. When we have this rear part of the impression in a flowing state, dip in hot water and pass into the mouth, locate over the ridge and press the impression up against the ridge in front, without pressing it up in the back. With the index finger of the left hand against the face of the biting-block, in the region of the medium line pressing backward, ask the patient to bring the lips together, close firmly, and swallow, giving the facial movements, and hold for about a minute; then chill with cold water. Our impression then should stand all tests. The patient should not be able to dislodge with any facial movements.

We should not be able to dislodge by pressure with the fingers in any angle. If the impression stands these tests, we can consider the impression perfect. If both impressions test out properly, we have the patient bring the lips together and swallow; that will give us our correct relations of the occlusal plane; then we are ready to put on the face-piece. Do not proceed with the dentures until the impressions stand the above tests.

Take a roll of wax and lay across the face of both upper and lower impressions. Have the patient give the face movements. This will evenly distribute the compound over the impression. Allow to cool, then mark our median line, our smiling line, our lip line, and the impressions are ready to take out of the mouth for the articulator.

SOFT RIDGE IN FRONT

The difference between the technic in a hard and soft ridge is as follows:

After we have secured our basic impression, which we allow to run back one-eighth to one-half inch on the vibrating soft tissue (the distance depends upon the softness of a ridge), to compensate for the pressure brought to bear when incising to prevent tipping, we proceed the same as in a hard ridge until we come to the step of replacing our displaced tissue and getting the labial and buccal borders under biting stress. Cut off the labial rim as far back as the soft tissue is displaced. Scrape away the impression under the displaced tissue until you can push the impression to place without displacing the soft ridge; then soften the impression that has been cut and scraped away, by passing through the tip of the flame. Take a small roll of soft compound and lay on a new rim and pass through the flame. Warm all compound that will come in contact with the soft ridge. Dip in hot water, pass into the mouth and have patient close on same; then quickly push warm compound up under lip, ask patient to give facial movements two or three times; then give light massage by pressing gently inward and downward on the lip and cheeks. This will push the displaced tissue back to the normal position. If we allow this tissue to be displaced and make the denture accordingly, we will frequently have pain in the region of the antro-palatine canal, due to the circulation being impaired by the tissue being drawn abnormally forward over the canal. We will also have the patient complain of the plate sagging or not fitting perfectly back of the biscupids, due to the displaced tissue trying to get back to normal.

Hume Mánsur Building.

DISCUSSION

Dr. J. V. Howard: This paper is somewhat hard for me to discuss, as I can but heartily agree with every point taken by the essayist. There is nothing left for me to do but to eulogize the essayist, and to emphasize a few of the many important steps. This I shall do, following the order of the paper.

Plaster impressions cannot obtain the features that are possible to obtain in modeling compound impressions, viz: height of rim, thickness of edges, exact length of plate in the rear, and accommodation of muscular attachments.

A plaster impression must be taken with the mouth open, (at least I have never seen nor heard of one taken otherwise). We all know that a muscle in action assumes a different position entirely from the same muscle in the rest position. The biceps take a natural position when the arm is hanging by your side, but when the arm is drawn up and the biceps are in action, it acquires an entirely different position. This is true with all muscular activity.

When the mouth is open the muscles are stretched, are flattened, and when the mouth is closed the muscles are relaxed and are much thicker. A rubber band will nicely illustrate what I mean: when it is in action it is drawn out and is flattened, but when at rest, or relaxed it is much thicker.

A plate made over a plaster impression may fit the mouth and muscles well while the mouth is open, but when the mouth is closed, as it is most of the time, two things are sure to happen: the muscles through relaxation require more room, hence your plate is dislodged; also in assuming a different position they pull away from your plate and cause a leak, hence a lack of atmospheric pressure, and muscular adhesion.

I invite your special attention to a patient presenting whose nose and chin meet; here the resorption is so extensive that the lower ridge is almost gone; nothing remains but muscles, muscular attachments, and a knife-edge ridge. A plate must be worn upon these muscles and their attachments, and must be retained by them while in action as well as while at rest. Tell me, how in the name of reason, are you going to get a plaster impression of these muscles while exerting their normal function? I am like the old man, "it can't be did!"

When the mouth is open, the tongue is drawn down in the floor of the mouth and all of the lingual attachments are out of working position. How can a patient swallow or lift the tongue with the mouth open and full of plaster? And if he could and did swallow, what would be most likely to happen? I'll tell you; an abdominal surgeon would be necessary to remove balls of plaster from the patient's stomach.

The essayist has laid much stress upon *diagnosis*, and yet, because of its great importance to you and of its true value to your patients, I feel that I must speak of it again, and with the largest spike known, nail it to your memory.

The proper diagnosis of the case in hand will save you and your patient many hours of torture, and many cases of total failure, and be the stepping-stone to many successes. You must know what you are required to meet. You must be able to see the existing obstacles. You must be as the artist, have the picture in your mind and see the finished product from the chaotic materials at hand.

What would you and the general public think of a physician, called to treat a case of smallpox or diabetes, who would say, "Let me see your tongue," and with his finger on the radial artery for one minute, would begin at once to prescribe, and to promise that the prognosis would be good? You and they would say, "None of that in this enlightened day for me. I want a man who will go the limit in diagnosis; who knows facts."

The same challenge and the same demand is upon the dentist of today. When an edentulous patient presents, he is as needy as an infant. He may talk to you in terms of dollars, but what he means, and what he wants is something that will prolong his life, by giving him health, strength and happiness, and increase his efficiency. Something that to him is worth while. And gentlemen, you cannot deliver the goods, nor make good any promises, without an accurate and complete diagnosis, and a history of the case in hand.

As to the requirements of an impression tray, and the paraphernalia used, all of this will be brought out in detail in the clinics later.

Kerr's compound is the most adaptable for this work, as all others, to my knowledge, contain too much gum, and it requires too much heat to reduce them to a flowing consistency to be permissible in the mouth.

I think the secret of this work lies in the using compound at the proper temperature, and under biting stress. If your compound is too hot, or heated over a flame until in a flowing state, it will burn your patient; if it is not hot enough, it will be tough, hard and stringy, and the soft delicate tissues will fail to properly embed themselves. In either case you make a failure, which could be avoided by using hot water at the proper temperature, as a heat reducing, or equalizing medium. Hence, water at the proper temperature is the sequel of the story.

The essayist is very thorough and concise in the discription of his technic. I desire to emphasize a few of the points mentioned:

1. He speaks of the occluding plane of the upper and of the lower, as though they are separate and two distinct planes. He is right in his thought, but might be ambiguous to the man unfamiliar with the term and method. The occlusal plane is an imaginary line established by forcing the biting-block up until its occlusal border is parallel with an imaginary line drawn from the ala of the nose to the lower border of the external auditory meatus. When the upper border of the lower tray, or the so-called lower occlusal plane comes in contact with the lower border of the established biting-block, or the so-called upper occlusal plane, we then have estabished the *occluding plane*, which is the imaginary line, drawn as above described. Bear in mind, there is a vast difference between the occluding plane and the plane of occlusion. The former we establish with our biting-block, the latter while setting up the teeth.

2. While taking the lower impression, be sure to draw the compound too far forward, letting it rest anteriorly to the ridge, allowing the lips and cheeks to carry it back to place in the act of closing and swallowing.

3. Too little compound in the molar region, rather than too much, while taking the basic impression of the lower, thus averting the mistake of causing the patient to throw the jaw forward.

4. Be sure to chill thoroughly, before attempting to remove impressions from the mouth. Remember, compound hardens from the outside inwardly; and when the surface may appear to be hard the interior may make the outer crust still flexible, and distort your impression.

5. The difference between a temporary fit, and a permanent, improving fit, should be noted. Temporary fits are due to improper displacement of soft tissue.

6. Be sure to flow the compound, *under biting stress,* to the rear of your upper impression; because the line of pull on the palatal muscles is to the rear rather than forward.

7. The essayist does not mention the accommodation of the coronoid process of the mandible. This will very frequently dislodge the upper plate when the patient yawns or opens the mouth wide. The last step for the upper impression should be to warm the compound slightly, buccally and posteriorly, to the tuberosities and insert in the mouth, and have the patient open wide and close and give the face movements.

8. Distinguish between the flowing, mōlding and flexible states of modeling compound in the scientific method of taking impressions.

The President: This has been most interesting and valuable to us, and especially to those who have been fortunate enough to have become acquainted with Dr. Supplee's methods, for we can appreciate this more than the others. To me it has been a fine review, and I have been able to follow every little step in the technic there, and I believe there are a number here who are using the method who would be glad to discuss it.

Dr. W. L. Myer, Rensselaer: It has been my good pleasure to take a course of lectures under Dr. Supplee, and I have used this method in my office for about five or six months. I have made over some plates that had been very unsatisfactory, that I put out before I took the course, and I am very much gratified with the results that I have obtained. I think I have yet some things to learn about taking impressions, but as

Dr. Howard emphasized we want to go into the laboratory and learn modeling compound, the flowing state and moulding state. There are many things to learn about modeling compound. I had one case in particular that was very unsatisfactory. The man himself did not come back to me, but I found out through the family for whom I did work that the plate was not satisfactory, and I sent word for him to come to the office, that I wanted to see what was the matter with the plate. I made it over with the Supplee method, and Dr. Brown and I looked it over the other day, and it is a plate which any Dentist would be proud to have made. I think any man who will devote himself to it and take the time, can make a plate under the Supplee method that will be absolutely satisfactory.

Dr. Green: I would like to ask Dr. Kibler if he made failures with all the plaster work he ever did before he tried this compound?

Dr. Kibler: No, Sir.

Dr. Green: I believe there have been plates made with plaster impressions that have been fine, and my idea is that modeling compound is all right if you have a mouth for it, and plaster is all right if you have a mouth for it, and a man must find out what mouth he has, and then pick out the material for it.

Dr. J. W. Stage, Goshen: I have had a little experience with this, and I believe I should say a word to my good friend, Dr. Green, to set him to thinking. When Dr. Green sees this work in the clinic, I believe he will conclude that modeling compound he has never known. My experience with this work is simply this in that respect, that we never could know modeling compound until we first had a little apparatus by which we could handle it. That is the reason that the man who knew nothing about this practice would say first that he could not see any comparison between it and plaster, or that plaster is as good as modeling compound, or vice versa. We never could know modeling compound until we had something to handle it with. The first case I undertook to manage with this technic was a case which no one likes to see come into his office, a type of case, in other words, that is just as hard and mean to handle as anything you can possibly imagine. With all my greenness and inexperience with it, I got away with the case, and the lady is satisfied. The second case which I applied this method to—I am speaking now particularly of full uppers and lowers—was a case of marked irregularity, a case which no one would care to see very often, in other words, much easier ones often present themselves. That was transformed into a success; at least without any question you could call it a ninety per cent. success; there are a few things about it yet I believe I can rectify by possibly making part or all of it over.

The third case in which I have had something to do with this method was a case of an old gentleman totally edentulous, with an ideal mouth. He had had plates made more than eighteen months ago in Wisconsin by a conscientious friend of his, but according to the anatomical articulation they were very poor, he did not have anything he could use in the least. His lower plate he was totally unable to keep in his mouth, and the upper, the minute you placed it inside his lips and took your fingers off, down it came. I followed the plan there of using his old dentures as trays, by first grinding the articulation to meet an approximate articulation. The old dentures that he had articulated very well in the region of the molars and bicuspids, but they were badly off in the anterior, and I could not account for it. But I ground those teeth until I got an approximate articulation, when his mouth was closed. I took the impression in that case in those old dentures by first cutting them away as you would according to this technic to re-rim an old plate. Before I told him I would do anything for him whatever, I told him I would see what I could do. I simply prepared these old dentures the way referred to, and took the impression partially in the modeling compound with these old plates as trays. He could not throw down the upper denture with all the movements of his face. When you try to take an impression in that way, and ask the patient to throw down, if possible, the upper denture, we mean for him to go through the ordinary movements to try to throw that denture down by pulling his face about. I believe Dr. Green will have to do well to produce a plate made from plaster impressions which a patient cannot throw down. I would not have believed it myself, and I know Dr. Green doesn't. I had to be shown, but you must believe it when you produce the results yourself with only a little experience. This man's dentures are perfectly satisfactory. He had had no teeth in his mouth for eighteen months. He has had these dentures I constructed on this plan about two or three weeks now, and he tells me he is learning to eat very nicely, that the plates do not loosen in the effort to masticate, and what better success can you ask for?

Dr. F. A. Brown, Dale: I want to ask Dr. Kibler, does he take all impressions according to this method? Also, if you do, do you have trouble in taking the lower impression where the six anterior teeth are remaining below, and there is a great deal of resorption?

Dr. Irwin: To those of us who have taken the Supplee course, it is very apparent that the person who has never taken it, after hearing Dr. Kibler's paper -and he has covered it well—will consider that it is just a jumble in a measure. I do not believe anyone who has not taken it can follow it, but I believe that after seeing the clinics tomorrow in the limited time that the doctor will have, he will show you that your old method of making artificial dentures and taking impressions is absolutely wrong. He won't teach you by following his work as closely as you may that you can go home and use that method in your practice, but it should teach you that you are wrong, and you will have an opportunity to enter classes and get this.

Dr. W. R. Meeker, Peru: I had the pleasure of being in Dr. Supplee's course, and had the pleasure of reviewing a couple of days with Dr. Kibler, and of being with the Miami County Dental Society when we had two men come from Logansport and one from Mentone for two weeks with Dr. Mead, who has been connected with the Supplee laboratory in New York for about two years, and I want to emphasize what the last speaker has said. Do not expect to get it all in the few hours you may witness the clinics here tomorrow. I perhaps did not grasp as quickly as some of you will the different points in taking the impression. I have one point in mind that when I came down and reviewed with Dr. Kibler had slipped my mind, and that was the point mentioned by Dr. Howard, the relieving over the tuberosities just as your plate is finished. That one point slipped by me and it made me fail on one plate. Another point I think was not mentioned was the making of the extra pressure in the posterior third of the plate, where you have the soft ridge in front. Those people who see a soft ridge impression taken will realize that is important. Do not expet in a few hours to grasp the technic of taking this impression, because you may fail, and then you will blame the method. I want to endorse the method very strongly.

Dr. C. E. Redmon, Peru: Everybody who knows anything about this is enthusiastic. Dr. Kibler told me last Spring that it was the greatest thing he knew of, and I knew it was all right, because he said so, and I sat down and got what I could at his clinic here, but I couldn't get enough of the technic to more than take a lower partial impression with the teeth remaining. But that was enough to pay me to go down to Philadelphia and take that course, the satisfaction of taking a partial impression, which I followed up until the time we had the privilege of taking the course.

As to the case Dr. Brown asks about, that is easy. I had a case, a woman of 87, with the muscles contracted and there was a lot of fun getting that impression with the soft modeling compound. Many times I thought I would go back to the old method, and I would if it had not been for my assistant, Dr. Baldwin, who was skeptical about the method. He has, however, had the pleasure of viewing several beautiful cases in the last few weeks, and he says that he will take off his hat to this method, for it is all right.

When Dr. Green asks if all our plaster plates in the past have been failures, I will only say that if the Lord could forgive me for all the plates my patients have had that they are just getting along with, since I know this Supplee method, gentlemen, I could rest lots easier. Some scientist told us that the biting pressure with a full denture, that the maximum pressure was 25 pounds; and that the minimum with our natural teeth is 275 pounds. Now, people get along with those old plates, but I think we are going to save our patients years and years, because old people, when they lose their teeth and then get a new set, they think they can eat well, and sometimes it is a greater detriment to that old person to think they are doing a good piece of mastication than if they didn't have any plates in their mouths, and sometimes they go into decline after getting a new set of teeth. With the Supplee method, after you have ground up your set of teeth, you have articulated them and put them in the mouth, and you find they do not articulate correctly, by putting them upon your articulator and grinding or dress down with carborundum powder, you can make a set of knives out of them, and talk about efficiency—why, you cannot get it in any other way.

The President: I am a very strong believer in this Supplee method. The other day I had a case of a partial upper for a lady. The day before she was to come back for the plate, I received a postal card that she could not come. She lived out of town. She asked if I would send her the plate. I can imagine the result if you would send her such a plate made over a plaster model. I sent her this plate, and did not see her for three weeks, and when she came back she was wearing it, and had worn it all the while.

Dr. Kibler (Closing): I think by the discussion and paper you boys realize how much there is to this subject, and when I covered the subject as best I could in forty minutes, you can realize that I left out some things. It takes at least three days to give this course, and I could not very well cover everything in forty minutes. If Dr. Green had grasped all that was said in the paper—and I realize that is impossible—he would not have asked the question, as I told him the muscles with the mouth open are out of normal position. Our patients use their dentures with their mouths closed to masticate. I believe any one accustomed to this technic can improve any denture made by plaster impression, by simply re-lining it or re-rimming it. I did not have time to go into that technic, but we are going to try tomorrow to re-rim old dentures that have been made over plaster of Paris impressions for you, so that you can give that patient instead of 25 pounds of biting stress, 150 to 200 pounds biting stress. I do not mean to say that every impression we take and every denture we make is all that we desire. I do not think any operation in dentistry is always perfect, because there are so many things that can happen. Granted that you get a perfect impression, there is a great deal of technic to be followed after we get our impressions, and any good impression can be spoiled in the laboratory. If you pour up your impressions with plaster, your chances are slight of getting success. You take your impressions with the mouth open. Now, if you will close your jaws together tightly and put your fingers there, and feel that massiter muscle when it comes up, and feel how hard it is, and think we have been taking impressions with that mouth open and the muscles stretched out of normal, and putting our plaster down on that muscle and making models and dentures from that, and then put it in the mouth and expect the patient to masticate on that, it is no wonder they cannot get many pounds pressure or chew food.

As to Dr. Brown's last question. Is it easier with a full upper and lower than a partial in one jaw and full denture in the other. You simply use a partial impression tray, which has an occlusal plane on it instead of this tray we have here, and the technic is just the same as far as your biting stress is concerned in that technic as in your full upper and lower, and as far as the resorption is concerned, that makes no difference; it only takes that much more compound.

Dr. Harter asks if the dentures will loosen up after wearing. They will loosen up and will be failures if you do not follow the technic correctly; in other words, if you get too much pressure on your muscular attachments, or if you get them overstrained, it is easy for you to see that unless we give our muscles free access, that they are going to rebel and something will give away. Now, a muscle can be used either to advantage or disadvantage. If you take the proper impression of that muscle under normal biting stress, and do not get your compound up too high on the muscular attachment, but get it at the base of the attachment, (that is where you want it, not up on the muscle), so that when you try to use it it will dislodge that denture. If you get your impression just to the base of that muscle under proper stress you will not have the dentures loosen up. They will not be temporary fits. When you see a temporary fit in a denture, it is due to fautly technic and nothing else. The compensating pressure that Dr. Meeker spoke of, that is in a soft ridge. Those are the cases that will give you the most trouble; you can readily see if you have a soft ridge in front and a hard palate, when that patient incises this soft ridge will give and tip up a little. To compensate for that we must allow our plate to run back on the soft vibrating palate enough to compensate for that tipping. The point Dr. Meeker brought out is this, when we are correcting the rear third of the vault, after we have had the patient bring the lips together and swallow and close, that will force the compound up and cause it to flow towards the rear, and then after a moment we take our hands and hold on that impression in the bicuspid region so that it will not dislodge and burnish the excess up on this soft palate, so as to get abnormal pressure on the soft vibrating tissue. It all depends on the softness of the ridge, the length that that plate must go back and experience alone will teach you that. Mr. Supplee was eighteen years in working out this technic, so we must not expect to get it all in just a few days. Dr. Redmon wanted me to say to you who are doubting this if you will take an impression, either above or below—below is more spectacular—with the mouth open, and then take one with the mouth closed, and see the difference, you will begin to believe.

Let the weakest. let the humblest remember that in his daily course he can, if he will, shed around him almost a heaven. Kindly words, sympathizing attentions, watchfulness against wounding men's sensibilities—these cost very little, they are priceless in value. Are they not the staple, almost, of our daily happiness? From hour to hour, from moment to moment, we are supported, blest, by small kindnesses.—*F. W. Robertson.*

HELPS IN MAKING ARTIFICIAL DENTURES*

BY C. H. WOOLGAR, M.D., D.D.S., MAGDALENA, N. M.

ARTIFICIAL DENTURES are constructed to partially restore the appearance of the face, and the functions of mastication and articulation. Properly constructed dentures are one of the dentist's major operations. Unsatisfactory dentures have often caused a never-ending gulf between patient and dentist.

The lower jaw forms, with temporal bone, the tempora-maxillary joint, the condyles of the mandible articulate with the glenoid fossa, which is a concavity in the temporal bone.

The inferior jaw has a hinge-like motion, a gliding motion, forward and backward, and a rotary motion. The inferior maxillary bone has more free motion than any other bone of the body. Too often the hinge-like motion of the inferior maxillary is the only motion taken into consideration when constructing artificial dentures.

The two terms—Occlusion and Antagonization, will be used in this clinic; and, as defined by Dr. G. H. Wilson, occlusion pertains to closure—to shut in; therefore application to the relationship of the teeth of one jaw, while in contact and at rest, with the teeth of the opposite jaw. Antagonize—oppose; therefore, antagonization of teeth is the relation of the teeth of one jaw to the teeth of the opposite jaw when in action. The anatomical construction of artificial dentures takes into consideration anatomical occlusion and antagonization, and any anatomical peculiarities of the jaws that are to wear the artificial dentures.

The first step is taking the impression. Select an impression tray very little larger than the jaw, and one not deep enough to exert any force on the muscles attached to the jaw. If an upper impression, wash mucus from jaw with two or three drops of cresol in glass of water, spread thin layer warm modeling compound over inside of tray, insert tray in mouth, apply firm hard pressure on the body of tray with the fingers of both hands; if lower impression, thumbs of both hands. Remove, trim off excess compound, re-warm and re-insert; repeat operation until impression adheres to the jaw.

Jaws very hard to fit may be satisfactorily fitted by first procuring model of jaw, construct an impression tray either by casting or swaging a tray that fits tightly to the model, warm the tray and some modeling compound, spread thin layer of compound over warm tray and press tray firmly against jaw, remove from mouth and trim off excess of compound, warm and re-insert. Repeat this operation until impression requires some force to remove from the jaw.

Dr. W. C. Davis has devised a new impression that he fully describes in THE DENTAL SUMMARY of May, 1916. It has merit. Briefly it is as follows: Medium soft piece of base wax is cut about the size of the jaw, warmed and adapted to a rough model of the jaw. It is then warmed and transferred to the jaw, there molded to the jaw by the fingers, and the patient aids by closing the mouth and applying suction to the thin wax impression. It is necessary to remove the wax and trim excess where the wax overlaps any muscle. Then re-insert and have patient apply suction as before, until strong adhesion is developed.

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*Clinic given at the New Mexico State Dental Society, 1916.

I have found the Davis impression too fragile to pack Spence's Plaster into; when making the cast therefore, support it with an investment of plaster and sand or ashes. Casts made from Spence's plaster are harder and overcome the defect of expansion of plaster of Paris casts.

All casts should be covered with tin foil, if rubber plates are to be constructed. Tin produces a dense surface on the rubber, it prevents the formation of calcium sulphate at the time of vulcanizing, as often occurs with silex and silex compounds.

The calcium sulphate is not easily removed from the plate and forms a lodging place for bacteria and may cause inflammation of the mucous membrane of the mouth, too often met with, and, in the present light of oral hygiene, should be carefully avoided.

The usual steps are now taken toward fitting the trial plates in the mouth. Occlusal surfaces of trial plates are to be flat, parallel with a line from the root of the nose to the external auditory meatus.

We are now ready to get the measurements of the inclination of the condyle path. If you are using the Snow articulator, with the Hall antagonizer, the bite gauges are omitted. This operation is best accomplished with Snow's Bite Gauge, which contains claws on one side and cones on the other. These bite gauges are warmed enough to melt wax, and pressed, claw-side downward, into extreme ends of occlusal surface of lower trial plate, so the body of gauge is level with surface of trial plate.

The trial plates are now placed in the mouth, and jaws closed at normal occlusion. The wax trial plates meet along the occlusal surface; at the same time the cones of the bite gauge are forced into upper trial plate. Jaws are opened and lower jaw protruded, bringing trial plates together, so they meet anteriorly, but not posteriorly; the gauge cones partially penetrate the wax and register the amount of protrusion of lower jaw.

The models with trial plates are now to be attached to the articulator. To do this with correctness a face bow must be used. Dr. Bonwill's rule of equilateral triangle of the jaw, measuring four inches in all directions, is misleading, as Dr. M. H. Cryer's research work in measuring skulls proves. The author has measured a number of skulls and found the intercondyle to vary in their width over one inch.

The face bow, by which the models are correctly located on the articulator, has a mouthpiece attached to it by a clamp. The mouthpiece is warmed enough to melt wax and is forced into the upper trial plate, so as to be in the median line and parallel with the occlusal surface.

The position of the condyles should be marked upon the cheeks of the patient with a soft crayon pencil. To locate the condyles is not always easy, especially in some fleshy patient, and some of the aged. The jaw is opened and closed, carried from side to side with one hand, while the finger of the other hand is engaged in locating the condyle; the condyle is about one-half inch in front of the external auditory meatus, and about the same distance in front of tragna of the ear. The pointers of the face bow are now adjusted so they will easily pass over the cheeks of the patient, and their ends must be equi-distant from the ends of the bow. This is readily done by counting the marks on the pointers. When correct, the pointers are locked by the jamb-nuts.

The trial plates are re-introduced into the mouth. Normal occlusion can be ascertained by noticing if cones of bite-gauge re-enter former places in upper trial plates. The upper and lower trial plates are fastened together. The stem of the mouthpiece is passed through clamps on face bow, pointers placed over marks on cheeks, and bow clamp is firmly tightened. The face-bow, with trial plates, is removed from patient and face bow attached to articulator by loosening clamps on pointers, extending the pointers and re-fastening clamps. The bow is sprung over spurs on articulator joints.

Models should be mounted so bows of articulator are parallel. In mounting models on a Snow articulator, the upper model should be fastened first to articulator. It now remains to adjust sliding joints of the articulator to the angle of condyle paths. The trial plates are on the models; the lower one contains the bite gauges.

The sliding joints are loosened; also the articulator spring. The trial plates easily are made to assume normal occlusion, contact being at all points of occlusion; lower trial plate is brought forward and cones re-enter anterior impression in superior trial plate, the trial plates coming together the same as they did in patient's mouth, the condyle paths on articulator assuming same angle as that of the patient's condyle paths. The screws of articulator condyle paths are now tightened.

If the trial plates assume the same relation in the above two tests, as they did in the patient's mouth, the measurement of length of inferior maxilliary is correct. The articulator is now properly adjusted, and the face bow and bite gauges are laid aside. The teeth are arranged on the models following the law of arrangement as given by Dr. Gysi; six anterior teeth to set in the Bonwill dental circle, biscupid to first molar over crest of alveolar process, in a diverging straight line backward. Lingual cusps of the upper first bicuspids are a little above horizontal line of the buccal cusps. Second bicuspid cusps have a common line. Lingual cusps of first molar on a line lower than buccal cusps. Lingual cusps of the second molar on a line still lower than the lingual cusps of first molar, and a slight rotation of second molar, inward.

The teeth designed by Drs. Gysi and Williams, known as the "Trubyte," have splendid color, shapes of anterior teeth are excellent, cutting and crushing power greater than any other teeth on the market. While not true anatomical teeth, they are well adapted for anatomical antagonization. The practice of some to cut groves mesially-distally across the occlusal surface of molars, makes articulation easier at the expense of the usefulness of the dentures.

Care must be exercised in making lower dentures that the teeth are not too high, or the tongue in keeping food on the occlusal surface of the teeth will have a tendency to dislodge the lower denture.

The occlusal surface of a finished anatomical denture cannot be changed without impairing its usefulness.

The anatomical arrangement of the teeth may be destroyed in the flasking and packing of rubber, if the two halves of the flask are not correctly re-adapted.

I have given in full the technic of the face bow and bite gauges. The face bow is a very important invention; it permits us to measure the length of the inferior maxillary, thereby permitting the mounting of the casts so the bite can be opened or closed if desired. The face bow will remain in use possibly as long as artificial dentures are made; the new articulators will supplant the old articulators and the bite gauges will be forgotten.

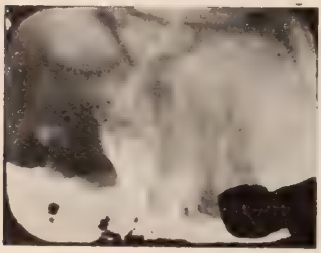
TEETH WITHOUT NERVES—A CASE IN PRACTICE

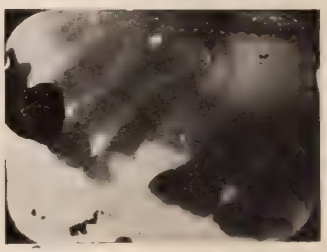
BY C. C. MOTTINGER, D.D.S., AKRON, OHIO

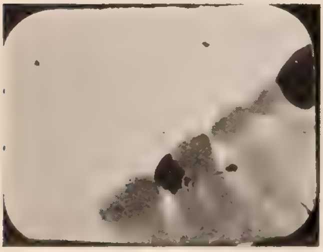
A FEW YEARS ago a young lady, who I should judge was about 17 years of age, came to me to see about having some of her anterior teeth fixed. Upon close examination I found that all of her teeth were ill-formed, very short, pitted, and dark in color. Especially was this true of the superior and inferior centrals and laterals. She did not have a normal bite, or one in which the anterior-superior teeth extended over the anterior-inferior teeth, but her bite was such that if her anteriors had been long enough they would have occluded the same as posterior teeth normally do.

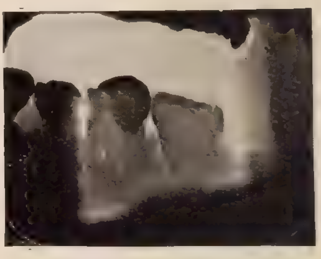
Now here is what the young lady wished to have corrected if possible. Her centrals and laterals did not come to the occluding point within one-eighth of an inch or more. All the other teeth occluded including the cuspids. This extreme shortness of these eight anterior teeth caused her to lisp considerably and otherwise interfered with her speech. On account of the general make-up of her teeth, as above described, I proposed crowning the eight anteriors, or centrals and laterals, with porcelain pin crowns, and extending their length so that they would properly occlude like the rest of her teeth. By crowning these teeth I could also improve very much on the natural color of her teeth. She agreed to have these teeth crowned as suggested Now comes the remarkable part of my story. When I came to remove the nerves of these teeth I found that *none of these eight teeth possessed a nerve or even the semblance of one.* Neither did they have root canals. To make place for the pins I had to drill a hole in each root as you would bore a hole in a solid block of wood. After this work was completed I was told to fill any other cavities that she might have in any of her other teeth. I found only one. This was in the superior left second bicuspid on the distal side. In this cavity I drilled as far as the pulp chamber should be but found none; neither did she feel the drill in the least. She said she never had toothache in her life either as a child or since.

Here is a case where I am positive in my own mind that not a tooth possessed by this lady ever had a nerve, root canal or semblance of life internally. Are there any of the numerous readers of The Dental Summary that ever had or ever heard of a similar case? Since writing the above I have, by request of the editor of The Summary, had some X-ray pictures taken of some of the teeth and here I desire to acknowledge my indebtedness to Dr. Samuel Wright, M.D., of this city, for taking the pictures and donating them for the benefit of the profession. You will notice that in most of the roots shown no sign of a root canal is visible. In a few of the roots as the superior cuspid for instance, there is a sign of a root canal. But I do not think or believe that any of those teeth have now or ever did have a *living* nerve in them.









There is a little additional material I wish to add to my article since seeing the lady recently and talking to her about the case. On looking up my records I find that I did this work (crowning) for her just six years ago this month. In talking to her the other day she told me that several of the roots split from usage and the crowns came off and could not very well be replaced, owing to the small short roots. Last summer I understood her to say, she had a close friend of hers who is a dentist, remove all the upper and lower crowned teeth and roots, and in place of them had an upper and lower bridge put in extending in each case from cuspid to cuspid, having gold shell crowns on the cuspids. You will notice several of these shown in the X-ray pictures. Also several amalgam fillings were placed in some of her posterior teeth which also show in the X-ray pictures. When I worked for her six years ago she did not have at that time any filled teeth at all. As I remember I found only one cavity and that was in the superior left second bicuspid on distal side. This I filled with amalgam. I also found the superior right and left first molars entirely decayed. Just the three roots in each case remaining. These I extracted and I well remember that all of these roots were very short.

THE SWAGED PLATE

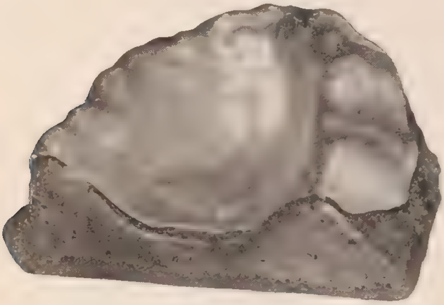
BY H. W. ALLWINE, D.D.S., OMAHA, NEB.

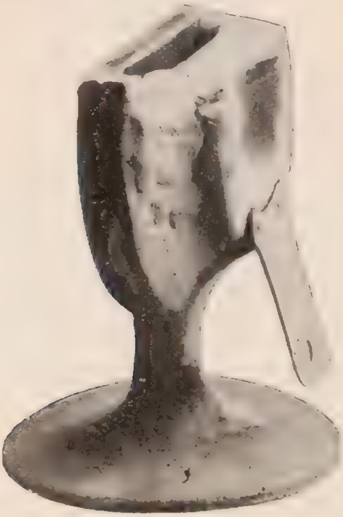
FADS COME and go, but the tried and useful things of life remain. A new acquaintance may take the place of a tried and true friend, but the loss is soon felt and regretted. We long for the friends who have been faithful in trying times. In our business and professional life, we want the things that serve us best, save time, labor, and that are of pecuniary benefit. This want is universal, among the thoughtful, in all classes.

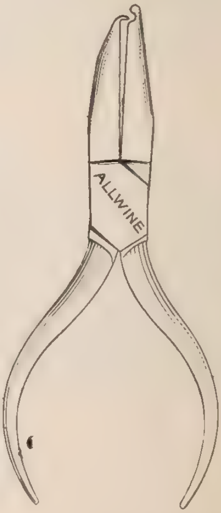
Before the discovery of the vulcanization of caoutchouc, metal plates alone were made, and the only method used was that of swaging. The old die and counter method had many griefs in store for the dentist. The old men of the profession, and many of the young men have worried over the failure to "draw" the model, having overhanging ridges, from sand, marble dust, etc. How often the core or sand were not dry, when the metal was poured, and the work ruined. Even if the die was nicely made, how often it was ruined by pouring the counter too hot. Even after the die and counter were made, how often the metal was torn in the swaging process. It is surprising that even today many dentists adhere to this very laborious and uncertain method of swaging.

Yes, fads come and go. Dr. Taggart set the dental profession all agog, in the casting craze. Everything possible had to be cast. The filling, the plate, the bridge, and appliances of all kinds had to be poured into a mould. The dentist who did not have some kind of casting machine, was a fogy, out of date, and ready for the professional scrap heap. The excitement has subsided, reason has returned, and all know the casting process has its place.

The subject to which I invite special attention, is the method of swaging metal plates. In forming the metal plate, the casting process has gripped many; I find, and, in all cases that I have met, the cast plate must be or is swaged to get a proper fit. I agree with Dr. Haskell, who in the *American Dental Journal*, of Jan., 1910, says, "To me it is a mystery why time is spent in doing what I have found from a long and exclusive experience in artificial dentures is not only unnecessary but the object can be better and quicker obtained by swaging. I have had experience in both methods, and achieve better results with the swaged plate, having tried both methods in the same cases. Don't bother with the casting process which seems to require so much detailed description and even then you are not sure of success. It is not only the extra labor required that would suggest a change, but the very aims are not secured. We want to save time, but the casting process is long and tedious. We want a thin plate, but the cast plate is thick. Many want a rim to retain the rubber, but a better and prettier rim can be made on the







swaged plate. I know of no feature in the swaged plate that is equalled in the cast plate."

To get the metal model of the mouth, take an impression with plaster or any investment compound, and mount it on a plain surface. For convenience, a stand, here shown, has been devised. If Malott's metal be used, the impression need not be dried, but the metal, at the melting point, may be poured into the impression at once. If Babbitt, or other high fusing metal be used, the impression must be thoroughly dried before the metal is poured. By this method, an absolutely correct model is obtained without labor or anxiety.

By the use of swagers now on the market, a counter of metal is not used. Paraffine, soap, and other substances are used instead. By this method practically hydrostatic pressure is applied, bringing the plate to the die perpendicularly at all points. Scratching and denting the plate are avoided. I know of one machine on the market that has a pressure of twenty tons to the square inch, with one hundred pounds power. The plate is swaged with an ease and accuracy that is beautiful. It requires no skill, and easily, in ten minutes an aluminun plate can be swaged. Also, by this method, after the loops and rim are soldered to the gold plate, hard wax can be run under the loops and rim and given a final swage. The wax is now washed out with hot water. The rim and loops are not injured by this procedure.

As to the rim that the cast-man boasts of, I would say that a better and neater rim can be put on the swaged plate, by the use of the pliers here shown, than can be cast. Note its form, take a pair of long-nosed pliers, and make one. It is not patented.

Since metal plates are so easily made, there should be more of them worn, for scientific reasons, with which all dentists are, or should be familiar.

Make yourself nests of pleasant thoughts. None of us know what fairy palaces we might build of beautiful thought—proof against all adversity. Bright fancies, satisfied memories, noble histories, faithful sayings, treasure-houses of precious and restful thoughts, which care cannot disturb, nor pain make gloomy, nor proverty take away from us—houses not built with hands, for our souls to live in.—*John Ruskin.*

Infantile Paralysis and the Teeth

BY G. W. COCHRAN, D. D. S., ERIE, PA.

YOU may be somewhat astonished to hear me state that Anterior Poliomyelitis—Infantile Paralysis—is of dental origin, dental irritation, reflex in character, traumatic in results.

For the past ten years I have been giving this paralysis proposition an unusual amount of study and a most rigid clinical investigation.

I have satisfied myself beyond any question of a doubt that the affliction or malady is due to pathological dentition, atrophying and putrescent tooth pulps.

I have arrived at this positive knowledge of the subject from an extended clinical experience. Having recognized pathological dentition, atrophying and putrescent tooth pulps, I removed what I recognized as a profound constitutional disturbance, and was astonished to witness the paralyzed subjects make speedy recovery to normal condition. I stand prepared to prove to the scientific world that the malady is purely of dental origin, reflex in character, traumatic in results.

No baby, child, youth or adult is in any danger of becoming afflicted, providing they are free from pathological dentition, atrophying and putrescent tooth pulps.

The only exception to the paralysis cases not making a speedy recovery, are cases where the reflected injury to the central nervous system was too long maintained previous to the real cause being removed, then we get what is known as a residual paralysis, atrophied or wasting limbs. When the medical profession and scientific investigators take up the dental aspect of this Anterior Poliomyelitis subject, and acquire a comprehensive knowledge of *Reflexes* of the fifth, pair of cranial nerves, they will speedily arrive at an absolutely correct solution of this paralysis malady.

SOME BODILY CHANGES DURING ANESTHESIA*

BY FRANK C. MANN, M.D., ROCHESTER, MINN.

BIBLIOGRAPHY

IN STUDYING the bodily changes due to an anesthetic or occurring during the anesthetized state, it is necessary to differentiate carefully the effect of associated conditions. The preliminary excitement, struggling, asphyxia and other accompanying phenomena produce changes quite apart from the anesthetic itself. The compensating physiologic mechanism necessary in light anesthesia is probably not the same as when a deep anesthetized state is produced. A short or long period of anesthesia may differ only in degree, provided the anesthetic tension remains the same.

The present investigation deals mainly with a study of the blood of dogs under ether anesthesia. While the associated conditions, as asphyxia, etc., were also included in the study, in general only the results obtained while the animal was under surgical anesthesia will be emphasized.

The blood is the carrier of the anesthetic substance in every method of general anesthesia, and it is important to know definitely how it is affected by each anesthetic either drectly or indirectly. This knowledge is of especial value in view of the fact that today more patients than ever before are being operated on under general anesthesia who have a lower hemoglobin content and more pathologic changes of other kinds.

While in the experiments herein reported the methods of etherizing differed, depending on the condition desired, the general procedure consisted in a preliminary etherization in a closed cabinet until the animal was completely relaxed, followed by the employment of the auto inhalation-method.[1] The latter consists in intubating in the same manner as for intratracheal insufflation. The intubation tube is connected through a valve tube with a double perforated ether can, which allows of a limited amount of rebreathing. With little effort, constant anesthesia can be maintained in this manner for long periods.

It was important to determine first whether the amount of circulating blood was diminished. This was estimated according to a method described in a previous publication[2], which consisted in bleeding the animal from the femoral artery and from the right heart and then comparing the amount of blood obtained with the total amount present in the body, estimated on the basis of 77 per cent. of the body weight. While this method gives only comparative results, it is accurate enough, when carefully controlled, to show gross changes. In a series of six normal animals which were bled immediately after being etherized, I was able to obtain an average of 76 per cent. of the estimated amount of blood. In a series of six animals which were bled after from six to nine hours of light etherization, only 64 per cent. of the estimated amount of blood was obtained. The decrease in the amount of circulatory fluid would probably have been much greater if deep anesthesia had been employed. The result is due undoubtedly to loss of muscle tone and venous stagnation, as explained by Gatch[3].

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*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916,. From the Laboratory of Physiology, Mayo Clinic, Rochester, Minn.

The lipoids of the tissues seem to have the greatest affinity for the most common anesthetic substance. Of these lipoids, lecithin and cholesterin are the most important. The dissolving power of ether and chloroform for these two lipoids has formed the basis for the best known theory of anesthesia. As it has been shown that lecithin is greatly increased in the blood during anesthesia[4], it was desirable to know whether the cholesterin content of the blood also underwent changes. Accordingly, determinations of the cholesterin value of the blood were made in one series of experiments. The method employed was that described by Bloor[5]. The cholesterin was estimated just before anesthesia, immediately after a stage of prolonged excitement and then at different intervals after etherization. In active dogs the cholesterin content of the blood does not seem to undergo any great changes during a period of time equal to that for which our dogs were kept under anesthesia. In the anesthetized dogs it was found to change considerably, but the variations were not uniform enough to permit definite conclusions. In general, it seems that the cholesterin value increases during excitement, decreases below normal after an hour or so of anesthesia, and then gradually increases above normal on further etherization (Experiment 62).

Previous investigation has shown that the viscosity and specific gravity of the blood remain the same under light anesthesia, but both increase when the animal is deeply anesthetized[6]. In several of these experiments the specific gravity was estimated by both the Hamerschlag and the Roy Jones methods, and the foregoing results were corroborated. Under light ether anesthesia the specific gravity of the blood does not change even though the etherization is maintained for as long a period as ten hours. However, when the animal is deeply etherized and respiration becomes shallow, the specific gravity increases a few points in the fourth decimal, probably because of the asphyxia.

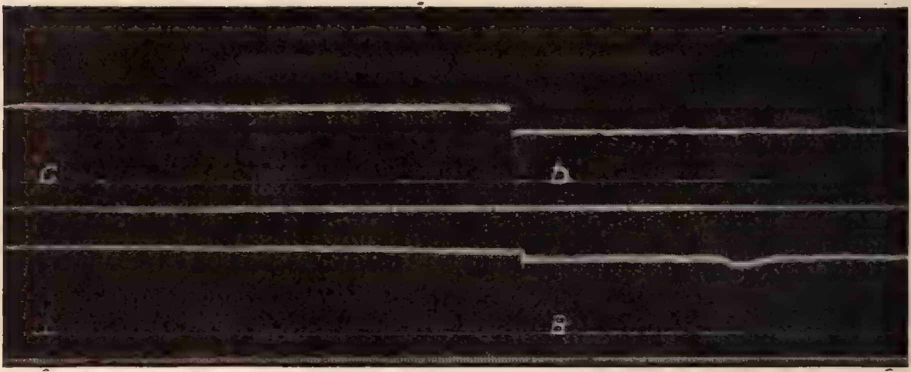
As ether and chloroform lake the blood, it has been thought that these anesthetics might have a deleterious effect on the red cells and hemoglobin. This possibility was tested in several experiments. A blood count and hemoglobin estimation were made before anesthesia and at different intervals after etherization. The ordinary hemocytometer and a Dare hemoglobinometer were used. As a rule, neither the hemoglobin nor the number of red cells underwent changes greater than the coefficient of error, even after ten hours' etherization. In some of the experiments there was an increase in both, but it was slight. In a few experiments the resistance of the red cells before and after etherization was determined by the fragility test of Ribierre.[7] No change in the resistance of the erythrocytes of hyposmotic salt solution was noted.

TABLE 1.—CHANGES IN THE NUMBER OF WHITE BLOOD CELLS UNDER ETHER AT DIFFERENT HOURS AFTER ANESTHESIA.

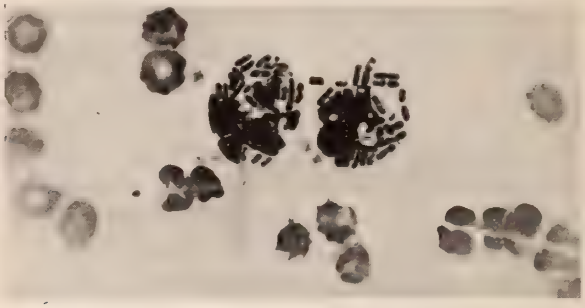
No. of Exp.	Normal Count	First Half Hour	First Hour	Second Hour	Third Hour	Fourth Hour	Fifth Hour	Sixth Hour	Seventh Hour	Eighth Hour	Ninth Hour
51	.....	18,400	.....	.....	19,100	.....	.....	27,200	.....	.....	39,300
52	.....	10,920	.....	.....	14,470	.....	.....	14,520	.....	.....	15,400
53	.....	15,960	.....	.....	13,420	.....	.....	18,340	.....	.....	18,870
54	.....	13,200	.....	.....	14,400	.....	.....	29,900	.....	.....	29,900
60	7,000	.....	8,100	.....	.....	.....	15,000	15,800			
61	10,400	18,400	.....	20,250	.....	.....	39,900				
69	12,150	13,700	.....	.....	.....	.....	24,000	.....	.....	19,000	
70	21,450	25,000	.....	.....	.....	.....	.....	32,750			
71	20,600	.....	.....	.....	.....	23,450					
72	33,850	44,550	.....	.....	.....	.....	.....	.....	50,450		
73	19,800	.....	.....	.....	.....	.....	39,400	.....	46,100		
74	13,300	13,950	.....	.....	.....	39,400	.....	.....	51,300		
75a	20,000	24,800	.....	30,750	35,000	.....	.....	28,330			
75b	8,000	.....	10,000	14,000	17,000	23,830	25,230	25,000	27,000	29,000	
76	14,900	18,700	20,000	26,900	27,900	67,920	29,300	30,000			
77	18,050	.....	18,450	20,000	24,800	28,650	30,500	.....	35,800		
78	21,450	.....	33,650	35,400	44,100	45,000	45,000	.....	.....	40,000	
79	14,000	.....	17,750	21,650	23,850	25,000	21,180	23,050			
81	12,000	18,000	19,250	18,000	21,650	23,300	.....	24,580			
82	26,000	.....	.....	.....	35,000	.....	.....	39,000			
83	25,000	.....	.....	.....	30,000						
85	18,500	.....	.....	.....	20,100	.....	.....	.....	.....	27,100	
86	12,000	.....	.....	.....	.....	.....	19,452				
87	17,000	.....	.....	.....	.....	.....	19,000				
88	16,100	.....	.....	.....	.....	.....	25,400				
89	15,100	.....	.....	.....	30,500	.....	.....	47,450			
90	11,800	.....	.....	.....	.....	.....	19,000				
91	21,000	.....	.....	.....	.....	.....	.....	40,100			

Leukocytosis occurs in a dog under ether anesthesia, provided the anesthetic is maintained long enough. Occasionally the white cells increase in number within the first hour of anesthesia, but frequently not until after four hours. The increase may be very slight, in some animals not above the coefficient of error, but usually by the end of the fourth hour of anesthesia the number of white cells has doubled. The leukocytosis is not always progressive. Frequently a maximum number is reached which more prolonged etherization does not change. Sometimes there has been a decrease before the end of anesthesia. Usually, however, the number of white cells does not begin to decrease for a few hours after the animal has recovered from the anesthetic, and is still above normal twenty-four hours after etherization (Table 1).

The leukocytosis just described is practically a constant and general phenomenon. It is not limited to the peripheral circulation, for the white counts are usually the same in the blood from ear veins, femoral veins and mesenteric veins (Experiments 54 and 80). This fact that the white cells are increased in the blood in widely separated parts of the body, also eliminated the possibility that stagnation to dependent parts or reaction to external irritation were factors. Such leukocytosis occurs in animals in which a moderate leukocytosis is present already (Experiment 91). It resembles a leukocytosis of digestion. All of our experiments, however, were performed on dogs that had not had food from twelve to twenty-four hours. It differs from the leukocytosis produced by drugs, such as pilocarpin, in the fact that it is not a lymphocytosis and atropin does not prevent its occurrence (Experiment 77).



Tracing showing changes in blood pressure under ether. *A* is record of blood pressure immediately after etherization; *B* is three hours; *C* is six hours and *D* is nine hours after etherization. During this time the pressure decreased from 105 to 60.



Photomicrograph.—Two phagocytes filled with bacteria. These cells had been subjected to 5½ hours etherization before given access to the bacteria.

The spleen is not an important factor in its production, for it occurs also in animals that have been splenectomized. Its cause and site of action have not been definitely determined, but it would appear that it is a direct stimulation of the bone marrow.

Differential counts of the blood before and after ether, show that there may be an actual increase in all of the forms of white cells, but that the polymorphonuclear cells are usually the only form showing also a relative decrease of polymorphonuclear cells noted. The large lymphocytes usually decrease relatively, while the small lymphocytes always decrease. The transitional cells usually show an increase. In one experiment the eosinophils increased greatly. The size and character of all the cells remain normal (Table 2).

Studies on phagocytosis have demonstrated that the phagocyte reacts to anesthetics in a manner similar to other unicellular organisms. Fat-dissolving substances, such as ether and chloroform, in weak solutions, stimulate phagocytic activity until a certain optimum strength of solution is reached.

Any increase in the amount of anesthetic substance above this produces a decrease in phagocytosis and finally a paralysis of the cells.[8]

In previous studies, the white cells have usually been subjected to artificial environment. They were separated from the blood, suspended in salt solution and, after the addition of the substance with which they were to be tested, such as carbon particles, were incubated for definite periods of time.

It was deemed of value to determine whether phagocytic activity was altered when the cells were subjected to concentration of the ether such as occurs in the blood under surgical anesthesia. In order to make conditions as nearly normal as possible, the following method was employed: Under local anesthesia one of the jugular veins was exposed, dissected entirely free from surrounding fascia and doubly ligated, a section about 10 cm. long being left between ligatures partially distended with blood. A suspension of *Bacillus coli* in salt solution was injected into this natural incubation tube, and after it was thoroughly mixed by rolling gently between the fingers, the skin was closed over the vessel. Under these conditions the blood does not coagulate, the phagocyte remains in its normal medium at approximately its normal temperature, and has access to the bacteria in approximately the natural way. After various intervals of time, an hour being found the most suitable, smears were made. These slides were used as controls. After definite intervals of etherization, the process was repeated on the other jugular vein with exactly the same technic. The cells in the latter vein had been subjected for several hours to a concentration of ether strong enough to maintain the animal under surgical anesthesia.

TABLE 2—CHANGES OCCURRING IN THE DIFFERENTIAL BLOOD COUNT BEFORE AND AFTER LONG PERIODS OF ANESTHESIA

Cells	Experiment 75		Experiment 76		Experiment 77		Experiment 79		Experiment 81		Experiment 89	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Polymorphonuclears..	64	86	76	81	78	89	66	86	79	90	76	93
Large lymphocytes...	13	5	9	6	6	3	6	6	6	5	10	3
Small lymphocytes...	17	2	10	7	7	2	20	2	7	0	5	1
Transitionals........	3	6	5	6	6	5	1	3	2	3	4	2
Eosinophils	3	1	0	0	3	1	7	3	6	2	5	1

The blood smears were stained, and a count of the phagocytes containing bacteria and the phagocytes without bacteria was made. Usually 200 white cells were counted on a slide, and frequently counts were made on several slides from one vein. The average was taken as the final result. Only the polymorphonuclear cells were included in this count. The occasional

TABLE 3—PHAGOCYTOSIS BEFORE AND AFTER ETHERIZATION

Exp. No.	Normal Count W. B. C.	Count of W. B. C. at Time Bacteria Were Injected After Etherization	Percentage of Cells of Normal Blood Containing Bacteria	Percentage of Cells of Etherized Blood Containing Bacteria	Number of Hours Etherized
87	17,000	19,000	73.5	87	5
88	16,100	25,400	21	36.5	5
89	15,100	47,450	45.5	57.5	5½
90	11,800	19,000	50	50	5
91	21,000	40,100	90	90	6

large lymphocyte or eosinophil containing bacteria was ignored. It is obvious that there are chances for error in the method, but I do not believe the average error exceeds 10 per cent.

The results show that phagocytes which have been subjected for from four to six hours to a concentration of ether which is capable of maintaining a dog under surgical anesthesia do not exhibit any marked changes in activity. In most of these experiments the greater number of cells containing bacteria was found in the blood subjected to the ether, but the increase was not sufficient to be of positive significance. It can be definitely stated, however, that there was no decrease in the phagocytic power of the cells in the blood subjected to etherization (Table 3 and illustration).

TABLE 4—FINDINGS IN EXPERIMENT 54

	Red Blood Cells	White Blood Cells	Specific Gravity	Hemoglobin	Blood Pressure
Blood taken from peripheral veins:					
Immediately after etherization........	5.775,000	13.000	41	70	105
Three hours after etherization........	5.437,000	14.400	41	..	80
Six hours after etherization...........	5,675,000	29,900	41	..	75
Nine hours after etherization........	6,020 000	29,900	42	71	60
Blood taken from portal circulation:					
Nine hours after etherization.........	6,050 000	25,700	42	72	..

SUMMARY

A study of the blood of dogs subjected to etherization demonstrated the following facts: The amount of circulatory blood is diminished about 10 per cent. after six to nine hours of light etherization. There are variations in the cholesterin values, but the changes are not uniform. The specific gravity does not change under light etherization, and under deep anesthesia increases only as asphyxia becomes a factor. The number of red corpuscles, the amount of hemoglobin, and the fragility of the red cells do not change. There is always a leukocytosis in ether anesthesia. The degree of leukocytosis varies from a very slight increase in the number of cells to more than double the normal number. The increase is usually present after from three to four hours of etherization, and is due mainly to cells of the polymorphonuclear form. The leukocytosis is not dependent on the spleen and is not prevented by atropin. It is probably the result of a direct action on the bone marrow. Phagocytic action is certainly not depressed by an etherization period of from five to six hours.

The following experiments are presented as typical of the series they represent:

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7. Ribbere, P.: L'hémolyse et la mesure de la résistance globulaire: application á l'étude de la résistance globulaire dams l'ictére Thése de Paris, 1903, quoted by Sahli, H.: Diagnostic Methods, Philadelphia, W. B. Saunders, 1911, p. 769.

8. Hamburger, H. J.: Researches on Phagocytosis, *Brit. Med. Jour.*, 1916, i, 37.

Experiment 54.—July 27, 1915, a young adult female terrier, weighing 5 kg., at 7:55 a. m. was etherized and blood data were taken immediately. The apparatus was arranged to record the carotid blood pressure.

Experiment 62.—Feb. 19, 1916, female bull terrier in excellent health; weight 17.6 kg.

8:20 a. m.: Blood withdrawn from left jugular vein for cholesterin estimation. Animal very quiet. Cholesterin value, 0.266.

8:21 a. m.: Animal placed in etherizing cabinet and etherized very slowly.

8:50 a. m.: Animal intubated.

8:52 a. m.: Blood withdrawn; cholesterin value 0.312. Animal kept under surgical anesthesia.

9:55 a. m.: Blood withdrawn. Cholesterin value, 0.180. Animal maintained under anesthesia until 3 p. m., when, after another test was taken, it was allowed to recover.

3 p. m.: Blood withdrawn, cholesterin value, 0.358.

Experiment 77.—April 1, 1916, male mongrel; animal very quiet; weight 15.1 kg.

8 a. m.: Animal was given 1-9 grain morphin and 1-100 grain atropin subcutaneously

8:30 a. m.: Count of white blood cells was taken.

8:45 a. m.: Etherized quickly by Cone method. Animal maintained under surgical anesthesia until 4 p. m., when it was allowed to recover.

The counts of white blood cells were as follows:

8:30 a. m., 18,050
10:00 a. m., 18,450
11:00 a. m., 20,000
12:00 m. 24,800
1:00 p. m., 28,650
2:00 p. m., 30,500
4:00 p. m., 35,800

Experiment 89.—May 3, 1916, adult mongrel, male; weight 9 kg.

8:15 a. m.: Count of white blood cells taken from right ear vein and smears for differential count. Right jugular vein exposed under local anesthesia. Doubly ligated vein leaving it almost filled with blood. Length of vein, 8 cm. Total white cells, 15,100 Differential count: polymorphonuclears, 76; large lymphocytes, 10; small lymphocytes, 5; transitionals, 4; eosinophils, 5

8:30 a. m.: Injected 1 c.c. suspension of *Bacillus coli* into vein. Vein markedly distended. Gently mixed by compression.

9:00 a. m.: Animal etherized.

9:30 a. m.: Smears taken from right jugular vein showed that 45.5 per cent. of the phagocytes contained bacteria and 54.5 per cent. did not contain bacteria.

11:30 a. m.: Took count of white blood cells from right ear vein; count 30,500.

2:25 p. m.: Took count of white blood cells and smears for differential count from abdominal vein. Total count of white cells from abdominal vein, 47,430. Differential count: polymorphonuclears, 93; large lymphocytes, 3; small lymphocytes, 1; transitionals, 2; eosinophils, 1

2:30 p. m.: Exposed and ligated left jugular vein. Injected 1 c.c. of same suspension of *Bacillus coli*. Technic same as used on right vein.

3 p. m.: Count of white blood cells from mesenteric vein, 46,650.

3:30 p. m.: Smears made from blood of left jugular vein showed that 57.5 per cent. of the phagocytes contained bacteria and 42.5 per cent. did not.

Experiment 91—May 11, 1916, young male, mongrel; had had distemper for about four days; weight 8.5 kg.

8:20 a. m.: Exposed left jugular vein.

8:44 a. m.: White blood cells, 21,000.

8:45 a. m.: Injected suspension *Bacillus coli* into ligated vein.

9:00 a. m.: Animal under ether.

9:45 a. m.: Made smears from left vein. Of the phagocytes 90 per cent. contained bacteria.

Animal maintained under surgical anesthesia.

3:00 p. m.: Exposed right jugular vein and injected bacteria.

3:02 p. m.: Count of white blood cells, 40,100.

4:00 p. m.: Made smears from right vein. Ninety per cent. of the phagocytes contained bacteria.

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DISCUSSION

Dr. Isabella C. Herb, Chicago: This is one of the papers of the scientific session that should not be passed by without appreciation, if not discussion. I am pleased to note the tendency to present the more ultra-scientfic phases of anesthesia at our meetings, and this is an indication of progress in the right direction. The clinical phases of the art of anesthesia should not engross all our time; rather, from now on, the theory of anesthesia should be investigated. We are still inclined to place too much value on mere clinical observation without checking up our opinions with laboratory research.

While the question of blood changes under ether has been previously considered, the subject has been by no means exhausted, and what Dr. Mann has presented as his experimental data is well worth mature consideration. It is time that the effects of asphyxia or cyanosis (the concomitants of some methods of etherization) should be dissociated from the real physio-pathology of etherization induced and maintained with proper regard to the thorough oxygenation of the patient under operation.

Some years ago Hamilton Fish pointed out the hazard which anemia projected into the safe conduct of anesthesia, and his conclusion that any general anesthetic is contraindicated if the hemoglobin content is below 50 per cent., is fraught with significance. His contention that the leukocytosis of anesthesia is phagocytic in character is corroborated by Dr. Mann's researches and the photo-micrographs he has presented.

Perhaps one of the most important prophylactic measures in the control of shock is the clinical application of the experimental researches of Drs. Gatch and Mann in the preservation of muscle tone to prevent splanchnic stasis.

Also many of Dr. Gatch's contentions about the advantages of light anesthesia are corroborated by these researches into the alternations in the specific gravity and viscosity of the blood, during deep anesthesia and especially when the factors of cyanosis or asphyxia intervene.

The general leukocytosis found during etherization in Dr. Mann's experiments has been detailed by Chadbourne, emphasized by DaCosta and Kalteyer and corroborated by Casto, who is also of the opinion that it is a result of a direct action on the bone marrow

If my recollection serves me, all previous investigators rather inclined to the opinion that etherization had more or less of an effect upon the number of red corpuscles, especially erythrocytes; that the hemoglobin content was altered and that the return to normal was more or less delayed according to the length and depth of anesthesia. It may be that the asphyxial factor entered prominently into these previous investigations; although Casto in experimenting on the human subject and rats under nitrous oxid-oxygen anesthesia has found these changes more or less pronounced.

Recently Mendenhall has been working on the coagulation time of the blood under anesthesia and Crile and Menten have been determining the H-ion content. The sum total of these researches will give us a more thorough understanding of why the preconceived notion that etherization destroyed immunity has abruptly become an open question, especially in view of its therapeutic use in acute infections.

Dr. Mann is to be congratulated on being among those who are rewriting the physiopathology of anesthesia.

I should like to ask Dr. Mann whether the specific gravity of the blood was lowered when a great deal of oxygen was given with the anesthetic and also whether a closed method of etherization was used in the experiments?

Dr. F. W. Nagle, Montreal, Canada: I want to ask Dr. Mann whether I understood him correctly to say that there was no leukocytosis or hemolysis in the first hour of etherization. If I remember correctly Hamburger and Ewing found considerable hemolysis, even after only one hour of ether administration.

Dr. Walter M. Boothby, Boston, Mass.: At the meeting of the Pharmacological Society last winter and also the year before, I strongly urged that in experimental work dealing with etherization the dosimetric method of administration should be employed. Apparatus is available for this purpose. If Dr. Mann could state what anesthetic tension his animals had been under and for how long, his results would be comparable with others for future reference and experimentation. Such work as his is too painstaking not to have the slight administration. Even if not used in the clinic it should always be used in experimental work.

Dr. F. C. Mann (closing): In answer to Dr. Herb's question I would say that when anesthesia was light with no asphyxia, there were no changes in the specific gravity of the blood. Dr. Nagle understood me correctly; I did not find hemolysis. The method of anesthesia used was the auto-inhalation method devised by McGrath. While dosimetric methods may be ultra-scientific, in these experiments an effort was made to approximate the method of etherization to that usually employed in anesthetizing patients in surgical clinics. Dosimetry would certainly add a valuable control to the experimental results.

Whatever differences there may be in the results of these researches and those of previous investigators, are due, probably, to some extent, to the fact that our experiments were conducted under an improved method of etherization. The physio-pathology of anesthesia offers many interesting phases for research and we hope to continue our experiments along lines that will make their results applicable to the improvement of anesthetic methods and surgical procedure.

The subject of Blood Changes under Anesthesia and Analgesia has been exhaustively dealt with by Theodore D. Casto in an article in the American Year-Book of Anesthesia and Analgesia. All previous investigations of importance have been reviewed and Casto's own researches and those of Mendenhall, Menten and Crile incorporated. Also the Year-Book contains papers by F. C. Mann on the Periphereal Origin of Shock and by W. D. Gatch on Circulatory Disturbances due to Laparotomy, Posture and Anesthesia. These papers give the reader an insight into the mechanism of diminished blood-flow, splanchnic stasis and the role of light surgical anesthesia in preserving intra-abdominal pressure and the proper degree of muscle tone.—Editor.

Education is the unfolding of life, the cultivation of character, the discharge of duty according to ideals which become nobler and more compelling as they are obeyed. This is a process that continues through life, involving pain and discipline. But the result will ennoble the life and strengthen the will to follow after that which makes for goodness and helpfulness.—*Quoted by The Willows Magazine.*

WHAT IS DENTISTRY'S NEXT GREAT STEP*†

BY ALFRED C. FONES, D.D.S., BRIDGEPORT, CONN.

ONE OF THE GREATEST scourges that has been known to humanity in the tropics of the western hemisphere was yellow fever. Less than twenty years ago, many of the seaports south of us, almost to the extremity of South America, on both east and west coasts, were so full of this dreadful disease that captains of merchantmen were loath to unload their vessels at their ports for fear of the infection being carried aboard their ships. Horrible stories of suffering and death caused by this scourge were told, and, in their ignorance, the people believed it to be a necessary evil that must be endured.

The story of the conquering of yellow fever is now well known. Much honor is due to Dr. Carlos Finlay, a physician of Havana, who not only strongly and persistently maintained that the infection was carried by the mosquito, but named the particular mosquito, the *Stegomyia*, out of the six or seven hundred species of mosquitoes, as being the one that carried the infection. It remained for the now famous and immortal board of army medical officers appointed to investigate this subject to prove conclusively that the mosquito was the carrier of the disease. This board was comprised of Drs. Reed, Carroll, Lazear, and Agramonte, and, after much scientific work and experiment, and the loss of one of its members by death from yellow fever, it succeeded in establishing the facts so conclusively that yellow fever was eliminated in Havana. The great fact established by these men, after many painstaking experiments, was that if a patient, sick of the fever, was bitten by the stegomyia during the first three days of the sickness, the mosquito became infectious in from twelve to fourteen days afterward. By this knowledge the work of the Health Commission of the city was much simplified, and in a comparatively short time, yellow fever was stamped out.

THE "MOSQUITO DEPARTMENT" AT RIO DE JANEIRO

In July, of 1914, I stepped ashore at Rio de Janeiro and could hardly believe as I walked along the beautifully clean streets that less than twenty years ago this city was considered a pest-hole and was greatly dreaded on account of its yellow fever. Taking her inspiration from the wonderful work done in Havana, Rio realized what might be done for her, if similar scientific methods were employed. The city government voted to expend $60,000,000 to widen the streets, make boulevards, fill in the low lands and install a first-class water and sewerage system. War was waged upon the mosquito, all breeding-places were destroyed, and instead of $60,000,000,

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Rio spent $100,000,000. Today this beautiful city is one of the healthiest places in the world. It seems to us almost ridiculous that a city should maintain a "Mosquito department," but Rio does this. If a resident discovers a mosquito, it is his duty at once to inform this department, which immediately sends two inspectors to search the premises and the surrounding neighborhood to find out whether there may be any breeding spots for mosquitoes. Fines are imposed on any individuals who leave vessels containing stagnant water standing about to form such breeding-places. The result of all this vigilance is that yellow fever has been eliminated and there is not a screen or netting in the windows of any of the buildings in Rio.

In recounting this remarkable achievement of these members of the medical profession, it is not my purpose to draw a comparison and tell you how we of the dental profession can accomplish equal results regarding dental caries, yet there is a plan that I would like to present for your consideration, that is proving itself to be quite effective in eliminating dental decay, and which inspires the hope that the time may come, perhaps sooner than we now anticipate, when people with decayed teeth will be in the minority instead of in the great majority— as is the case at the present time.

RAVAGES OF DENTAL CARIES IN THE UNITED STATES

There are in the United States one hundred millions of people. Ninety-five per cent. of this number have decayed teeth, or, in other words, ninety-five millions of people have decayed teeth in their mouths. I think we will all agree with Dr. Osler, who said that if he were asked which was causing the greatest harm to humanity, alcohol or decayed teeth, he would unhesitatingly say, decayed teeth.

It is unnecessary at this time to reiterate or to enumerate the systemic disturbances that can and do arise from the septic conditions found in many unsanitary mouths. Our dental journals, and of late the medical journals, have given much space to this subject. The subject of septic conditions arising from imperfect and unsanitary dental operations is being thoroughly threshed out in our conventions, and many believe that the solving of this problem and the forcing of the dentist to follow methods that would insure sanitary operations of all kinds would respond to the statement of Dr. Mayo, that the next great step in preventive medicine should be made by the dental profession.

Although it is most desirable that all dental operations and restorations should be done in the most scientific manner, yet this alone covers too small a field to be the great factor in the solution of the problem of lessening the evils of unsanitary mouths, which are the cause of so many preventable diseases. There are forty-five thousand dentists, in round numbers, in the United States. These men can at the most take care of but fifteen millions of people. There are, in other words, but fifteen millions of people out of ninety-five millions, who give sufficient thought to their teeth to visit the dentist with any degree of regularity. This leaves eighty millions of people who give little or no attention to their mouths, excepting possibly to have a tooth out when it aches. Most of these eighty millions form the great working classes, who need sound teeth for good health, but for whom there is no provision in dentistry. How much sanitary, or unsanitary, dentistry can the man have, or his wife, or his children, who is earning twelve, fifteen, or eighteen dollars a week? These people suffer from septic poisoning due to diseased teeth, yet dental operations are out of their reach.

FOUR ETIOLOGIC FACTORS IN OUR DENTAL TROUBLES

Laying aside, for the moment, the consideration of certain factors that have influence in securing immunity to dental caries, such as the dietary, environment, habits, etc., the four factors that are the cause of most of our dental troubles are plaques, calcareous deposits, food debris, and microorganisms. In order to prevent dental diseases we must concentrate upon these four causative factors.

As a profession, we must realize that the elimination of these great evils depends upon our finding out, in some manner, how the plaques and calcareous deposits may be removed from the teeth at frequent intervals, and how the patient may be educated and trained in the removal of food debris.

There is contained in the saliva an ingredient known as mucin, which has the function of lubricating the food so that the bolus may be easily swallowed. This mucin is precipitated in the presence of an acid, and the glue-like film of this precipitate will catch and hold sugars and starches present on unclean teeth, as well as many bacteria. The action of the acids produced by the fermentation of the carbohydrates is greatly intensified by their being confined in this protecting film which fastens itself to the enamel surfaces of the teeth. Practically all initial decay takes place in this manner, and although the time may come when the enamel surfaces may be kept clean and smooth and polished by the application of our increased knowledge of what to eat and how to eat it, and of solvents for these plaques that will be quick, positive, and harmless in their action, yet many years will elapse before we find a method as sure and as positive as the mechanical removal of the plaques by hand polishers.

Although it might be construed by some very discriminating minds that salivary deposits on the teeth were pathological processes which might be obviated by correct diet, we must admit that we do not know, at the present time, exactly the right balance of food values that will eliminate the excretion of these lime-like substances. I would therefore state that we must assume that the deposit of salivary calculus is a physiological process, but that, if it remains around the necks of the teeth for an indefinite period, its presence in contact with the dentinal tissues finally induces a pathological condition. Therefore the removal of this deposit at frequent intervals is a preventive measure. The method of the thorough removal of food debris is a matter of educating the public in the home care of the mouth, and the only feasible way to accomplish this satisfactorily, to reach the greatest number, is to introduce it into our public schools.

MEANS OF COMBATING INJURIOUS MICRO-ORGANISMS

Micro-organisms are always present, and always will be present, in the human mouth, but we know that they are rendered inert and inactive if deprived of a food pabulum on which to thrive and multiply. Therefore our conclusions would be:

First: That, up to the present time, the frequent removal of plaques, stains, and accretions from the surfaces of the teeth by hand polishers is the most effective means known for the prevention of the initial stage of dental caries.

Second: That the frequent removal of all calcareous deposits around the necks of the teeth by instruments is most effective in the prevention of infection and destruction of the dentinal tissues surrounding the roots of the teeth.

Third: That the faithful use, daily, of the tooth-brush, floss silk, and a mouth-wash, such as lime-water made from the coarse calcium oxid, is the best means known for the thorough removal of food debris.

Fourth: That nearly all micro-organisms in the human mouth are harmless, if deprived of a pabulum, such as food debris, upon which to feed, develop, and multiply.

HOW TO APPLY OUR KNOWLEDGE

Now, if these are facts, how shall we make a practical application of them to aid the populace in preventing dental caries and appreciating the importance of clean mouths and sound teeth?

Such a tremendous work cannot be accomplished in a short time, and in order to *prevent* dental caries we must have the opportunity of working upon sound teeth. As every child is compelled by law to attend school, and as the children are to become the citizens of the next generation, it would seem that the wisest plan would be for the municipalities to incorporate in our schools a system for the prevention of dental caries. In the city of Bridgeport, Conn., we already have such a system, and the results being obtained convince us that not only is a prophylactic and educational dental clinic practical, but it is also slowly and surely proving itself successful. The surface treatments of the teeth given at regular intervals to the school children, and to our patients in private practice, is service that is beyond the power of the dentists themselves to render, as so much of their time and attention must be devoted to reparative work that it is not possible to cope with this subject of prevention alone.

We have found out by practical experience that women, educated and trained to do this special work, become expert prophylactic operators and are securing splendid results.

This work in the public schools is in no sense a charity, and the clinic becomes as much of an institution and a part of the school work as arithmetic or geography. Every child submits to a thorough examination of the mouth and is given the prophylactic treatment. If, through ignorance, a parent objects and sends a note to the principal, asking that the child be excused from the prophylactic treatments, such wishes are recognized; but, out of nearly twelve thousand children that we are handling in the public schools of Bridgeport this year, we have had less than sixty notes from the parents. This type of clinic costs about eighty cents per child, per year. This city thus takes one-half the responsibility in educating and helping the children to preserve their teeth. The other half is placed upon the child and its parents, in seeing to the dietary and the proper home care of the mouth.

Almost any municipality can afford this type of clinic. It does not pauperize the child, and is in harmony with our American idea that we are glad to help those who help themselves. Not only will dental decay be greatly lessened under such a system, but a much greater interest will be aroused in the proper care and preservation of the teeth.

The hardest work of all is that of educating the city officials sufficiently to secure an appropriation for such a clinic, and permission to enter the schools.

The plan we have adopted for our school work is as follows:

When the child enters school in the first grade, his mouth is carefully examined, conditions recorded, and his teeth given a thorough prophylactic treatment. Class-room talks are given by the supervisors, and tooth-brush drills begun. The teacher records on the blackboard, morning and afternoon, those who have and who have not brushed their teeth. It is our effort to see that, during the course of the year, each child has four prophylactic treatments, also repeated tooth-brush drills and class-room talks. When these children enter the second grade, the same form of treatment and teaching is followed, and so on, up to and including their period in the fifth grade. Stereopticon lectures are given to the children of the third, fourth, and fifth grades, the still higher grades being accommodated if there is room for them. Phamphlets containing illustrations are given out to be carried home by the children—reaching, in this way, the parents. Many of the children entering school at six years of age have the first permanent molars in place, with cavities developing in the fissures on the masticating and buccal surfaces. In order to start these children with sound permanent teeth, we are having these small cavities filled, in the schools, by a woman dentist. This operative work we term preventive dentistry, for in filling these small cavities at this early age we are preventing the more serious ones later on. No attempt is made to do general reparative work, but we have the paid services of a dentist, centrally located in the city, who will relieve the school children from toothache when they present cards which have been given to them by the principal of the school. By such a system the child is under instruction, education, and preventive treatment for the preservation of his teeth for the first five years of his school life, so that if, when leaving school, his teeth are decayed, he has no one to blame but himself.

For adults desiring to get the benefit of this preventive form of treatment, the dental hygienist in private practice is a necessity.

We know, from actual experience, that from eighty to ninety per cent. of dental decay can be prevented by prophylaxis and faithfulness in the home care of the mouth.

In the prevention of pyorrhea alveolaris, and also after the dentist has completed his surgical instrumentation, in the follow-up surface treatments and repeated instructions regarding gum-brushing, the services of these women hygienists are invaluable.

To have the mouths of the patients kept in a clean, sanitary condition, with pink gums and polished teeth, lends a new inspiration and pleasure to the work of the dentists.

LEGALIZING THE DENTAL HYGIENIST

In closing, I wish to speak of legalizing the dental hygienist, as the work of these women should be under the control and supervision of the dental profession.

I know of no dental law in the United States, excepting in those states that have a section dealing with this subject, that could prevent a dental hygienist from practicing.

All dental legislation is based on the cure of disease, the relief of pain, the restoration of lost tooth structure, and the correction of abnormalities, such as malocclusion of the teeth, expansion and contraction of the dental arch, etc. Practically all of these laws prohibit any individual, who is not duly examined and licensed by the state, from performing any of these operations upon the teeth and jaws. This is of course, as it should be. But there has developed a new phase in dentistry—that which is associated with physiology rather than pathology, and tending to prevent disease rather than cure it. This new phase of dentistry is termed dental prophylaxis, and its greatest and most important branch is the frequent removal of calcareous deposits from around the necks of the teeth, and the removal of plaques on the enamel surfaces, by means of the hand polishers.

I believe it would be exceedingly wise to insert a section in your law bringing the hygienist under control of the dental profession, and stipulating exactly what her field of service shall be. If she can have access to an educational course, the law should also provide for certain educational qualifications.

If you are in sympathy with this movement to provide a form of dentistry for the mass of people who can afford but little operative work, and your pride in our profession is sufficiently great to aid in any possible way to lessen this great curse, I believe you will give your hearty indorsement to any movement that may be started to incorporate in your law provision for the dental hygienist, and an educational course or courses, within the boundary of your state.

What is the next great step in dentistry? Is it not some definite, practical plan for prevention?

Until we have something that promises even greater results in reducing the great flood of dental decay, I ask you to give this plan, as presented to you, your most serious consideration.

About thirty lantern slides were shown which aided in the description of the education of the dental hygienist and her work in the public schools.

DENTAL SKIAGRAPHS AND THEIR INTERPRETATION*

BY E. B. LODGE, D.D.S., CLEVELAND, OHIO

I BELIEVE NINETY-FIVE PER CENT. of the pictures can be read with accuracy, and I think that statement is conservative. There are a few chances for error. Among them are the natural foramina, which might be likened to a resorption area. It is safe to say that a dark area indicates an area of rarefaction or less resistance, not necessarily an abnormal area. The antrum is supposed to look very dark. The floor of the antrum edgewise to the ray will produce a light line in the film, and the internal and external plates of the antrum, representing the side towards the cheek and the side towards the roof of the mouth, would offer little resistance compared with the floor. The same holds good as to the sockets of the teeth, the alveolus being presented edgewise shows the little white line, or linea alba. When that line is intact, it shows there has been no resorption of that portion of the alveolar process.

I am sometimes asked whether or not a tooth has a dead pulp. You cannot absolutely tell by the X-ray. If our picture showed a gold crown on a lateral incisor, for instance, and an area of absorption at the end of the root, a dark place, and there was evidence of a partial root-canal filling, I would feel reasonably safe in saying that was a dead pulp. Suppose there was evidence of a filling and no dark area at the end of the root, but suppose we had a little light streak part of the way up the root, a piece of steel in there, the pulp in that root would probably be dead. In the doubtful cases we must rely upon other means of diagnosis. Usually when there is dead pulp there is an area of resorption at the end of the root. The best way to familiarize oneself with the X-ray is to use it not only on the living subject, but on a skull. Great care must be exercised. Some roots are bound to be distorted, and other roots may be out of shape. In an upper molar, for instance, you should take more than one picture, and should take them from different angles. It is safer to have two or three pictures. We must remember that the lingual root leads off at an angle, and if we get the film and ray in proper position to get the buccal roots at approximately their normal length, the lingual root will be elongated and if we get the tube so that the ray will be correct for the lingual root, then the buccal roots will be foreshortened. We must understand it is physically impossible to get those three roots and have them the right length. If the lingual root is distorted, we might say that goes into the antrum, but as a matter of fact it usually does not. If you take a three-legged stool and hold it up against the wall and have a single light to cast a shadow from, you sort of get the idea of the difficulty of taking these pictures of the molars, for instance. With the stool you might correct that, but in the mouth the film must be placed at an angle because of the shape of the roof of the mouth, and to compensate for that the tube must be placed at a correspondingly high angle from the horizontal. In cases of resorption, we have to differentiate between areas that are normal as with the foramina, and with areas rarefied by disease and between portions of the mandible and superior maxillary bones, that offer less resistance to the ray. It is fortunate, of course, that we have different resistances by these different things, or we could not distinguish between the enamel and the dentin and the bone and pulp chambers. They all of course have different resistances. It is interesting to take a picture of the mouth with all of the teeth extracted. We can sometimes get the film flat, and passing it over slightly beyond the median line, we get the infra-orbital arch, and the position of the bones of the face. We must know our anatomy

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*Given as a clinic, Northern Ohio Dental Society, 1916.

Q. Can you diagnose a dead pulp before it sets up any trouble at the end of the root?

Dr. Lodge. I could not be certain by the X-ray only.

Q. A recent death?

Dr. Lodge. No, I wouldn't be able to do that, but I would have to resort to other means of diagnosis.

Q. Isn't it true that you, not frequently, but occasionally, find a seeming area of absorption at the end of the root indicating a blind abscess, and yet find the pulp vital?

Dr. Lodge. You sometimes do. In connection with suspected impactions of teeth, it is well to take a number of pictures from different angles. If you would ask me to diagnose a case from picture of an impacted molar, which in said picture was in apparent contact with the adjacent tooth, I would want first to know the angle at which it was taken. You should take a picture posterior to the right angle, and another picture anterior to the right angle.

Q. Isn't it true occasionally that even with a normal condition, you take an X-ray picture, and there are darkened areas showing rarefaction, where the tissues are perfectly healthy?

Dr. Lodge. That is a fact, and it is due, I think, to the fact that there is a thinning of the bone at that region. Take the mandible in the skull, and there are points where the thickness of the bone is less, and from there up the external oblique ridges offer much more resistance, and that portion of the film would be white and this dark relatively, while it would be perfectly normal. There are as many as seventy different conditions in dentistry that the X-ray will give you real information upon, that you could not get so well by other means of diagnosis. In all cases the X-ray evidence should be taken in conjunction with all the other findings in the case.

MICROBES AND DENTISTS*

BY F. E. STEWART, PH. G., M.D., PHAR. D., PHILADELPHIA, PA.

THE LITERATURE OF DENTISTRY, especially during the past few years, is filled with information concerning infections of the mouth and their relation to systemic disease. It has been truly said that to the dental profession belongs great credit for the wonderful success of the propaganda against microbic infection of the mouth now attracting the attention not only of the medical profession but the public in general, resulting in the world-wide propaganda now being carried on by the educational institutions in this country and abroad. This splendid work is so largely altruistic in its character in defense of the public against the dangers resulting from a septic mouth, that there is some danger of forgetting that microbes are also warring against the dentists themselves and their families. Should the children of the shoemaker go bare-footed? Is it not just as important for dentists to consider their own defense and the defense of those depending upon them, as it is to defend the patients and the public in general? With this thought in mind, I am presenting to you the results of the latest researches concerning microbes, their methods of warfare, and our methods of defense, realizing that this subject is of special importance both from the point of view of the dentist as a practitioner in considering the principles underlying the use of methods employed for the treatment of mouth infections, and also from the point of view of the dentist himself, and his relation to microbic invasion.

BIRTH OF A NEW SCIENCE: IMMUNOLOGY

The conception of *contagion*, or the communication of disease from person to person by contact, is very ancient, having been handed down from the time of Aristotle 384–322 B. C. In 1546 Francaster divided contagious diseases into two classes, those transmitted by direct contact, and those transmitted by substances capable of retaining contagious germs, as woolen garments, bed clothing, etc. It also was taught that contagious diseases were transmitted by breath, effluvia, etc. The term *infection* was applied to diseases produced by no known or definable influence of one person upon another, but where common climate, malarious or other widespread conditions were believed to be chiefly instrumental.

Ancient peoples attracted by the subsequent immunity enjoyed by persons who had recovered from the attack of certain diseases endeavored to render themselves immune by inoculating the disease virus taken from mild cases into their own bodies, hoping thereby to acquire immunity by a mild attack of the disease. Ancient kings and tyrants immunized themselves

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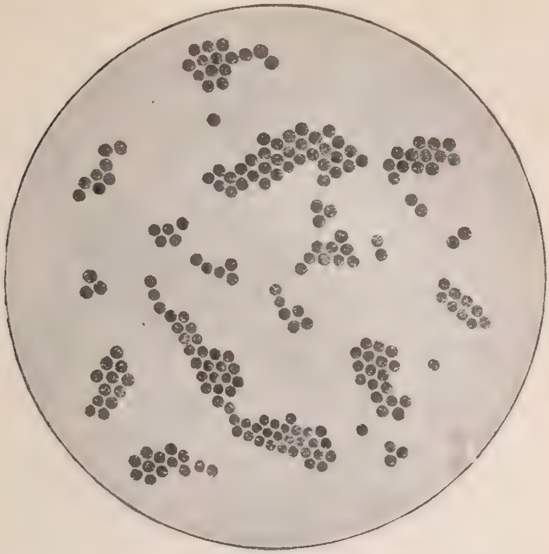
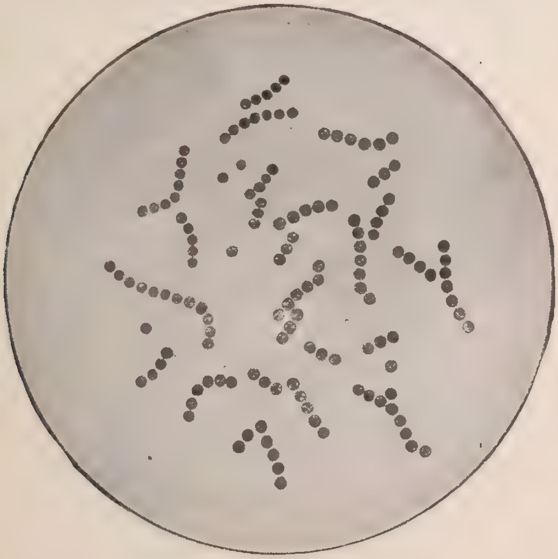
*Abstract of a paper read before the West Virginia State Dental Society, 1916.



Staphylococcus

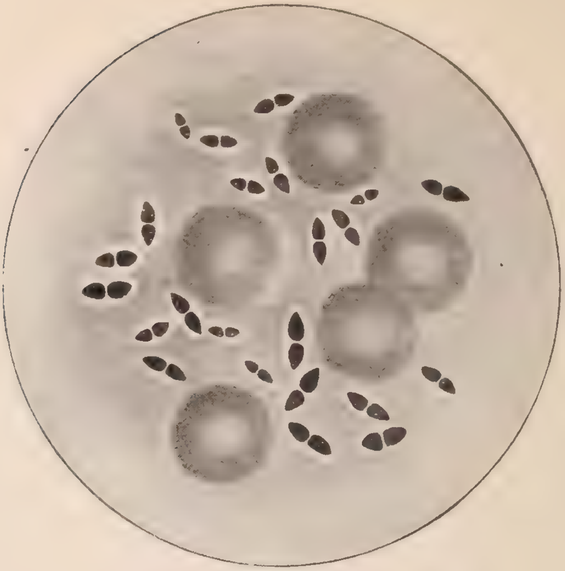
Staphylococcus.—This genus or form of bacteria is made up of cocci (berry-shaped bacteria) aggregated into irregular masses resembling bunches of grapes, from which the genus derives its name. These micro-organisms occur in three groups named from the color of their cultures,—staphylococcus aureus, albus and citreus.

The staphylococcus is the cause of boils, carbuncles, acne and various infections of the internal organs.



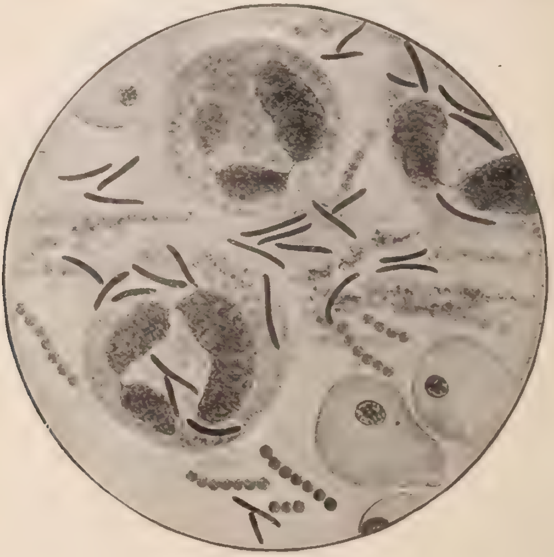
Streptococcus

Streptococcus.—This genus or form of bacterial micro-organism is made up of cocci arranged like a chain or string of beads. "Strepto" is derived from the Greek word meaning chain. Like the staphylococcus, it may cause inflammation and suppuration in all parts of the body. It plays a very important part in diseases of the mouth, throat, nasal passages, bronchial tubes, lungs, heart, joints and various internal organs.



Pneumococcus (diplococcus of pneumonia)

Pneumococcus.—This form of bacteria is made up of pairs of cocci united or arranged so as to produce oval or oblong shapes. The pneumococcus is the cause of lobar pneumonia, and is also capable of causing pleurisy, peritonitis, meningitis, inflammation of the internal ear, inflammation of the eye, the joints and internal organs. It is the cause of severe forms of catarrh of the respiratory tract, and may cause bronchitis or asthma, or it may be one of the infecting micro-organisms in pyorrhea alveolaris, a mixed infection in which several kinds of bacteria, and also the ameba buccalis (protozoan), may take part.



Mixed Infection

Mixed Infection.—Many infectious diseases are due to the presence of more than one pathogenic micro-organism. The above illustration is one of mixed infection in tuberculosis. There are present the typhoid bacilli (little rods) and the streptococcus (cocci in the form of chains). Some of the tubercle bacilli have been engulfed by the phagocytes, as shown in the illustration. Persons rarely, if ever, die of pure tubercular infection, the cause of death is due to the breaking down of the lungs by the presence of other micro-organism, especially the streptococcus.

against certain poisons by taking them in small and increasing doses, and it is said that Mithridatis, the Great, King of Pontus, thus became immune to all poisons in his time. From these crude beginnings a new science has finally developed known as the "Science of Immunology."

INFECTION

The Germ Theory of Infectious Diseases. Minute forms of life, far too small for observation by the unaided eye, were first seen and described by the Jesuit Kircher in 1659, and afterward by the Dutch linen draper, Leewenhoek, in 1675. These minute living organisms were first called "animalcula," but as knowledge concerning them developed, they were later christened "microbes", from the Greek words *micros*, small, and *bios*, life. The word microbe is now only used by the French. Bacteria is preferred in England and America.

During the century following the work of these pioneers, the efforts of investigators were mainly directed to the morphology and classification of these minute living creatures. In the meantime, thinking physicians began to suspect the causal relationship of microbes in certain infectious diseases. Their constant presence in the tartar from the teeth, in the intestinal contents, in water, milk and food, and in the dust floating in the air, was significant.

Plenciz, of Vienna, writing in 1762, not only expressed a belief in the germ theory of disease, but was the first to advance the doctrine that each disease had its specific germ, which grew and multiplied in the body and produced the various infectious diseases. But these speculations, unsupported by experimental data, produced but little impression upon the medical world and there was very little advance in the knowledge of the subject until nearly three-quarters of a century later.

The real advancement in the scientific development of immunology occurred along entirely different lines. The phenomena of fermentation had attracted attention of scientists, and there was much discussion of the process and its use. The philosopher, Robert Boyle, working in the seventeenth century, had prophesied that the mystery of infectious diseases would be solved by him who should explain the nature of fermentation. The subject attracted the attention of of Cagniard-Latour, who, in 1835, detected and described the yeast plant on which the process of fermentation in beer and wine depends. The same discovery was made by the botanist, Schwann, in 1837, and was confirmed by Helmholts in 1843. But it was left for Pasteur, a French pharmacist, to work out the problems of fermentation and connect them with those pertaining to infectious diseases. His observations were published in 1858, 1860 and 1863.

Pasteur had been carrying on his work along the lines suggested by Cagniard-Latour and Schwann. His researches not only confirmed their findings in regard to fermentation in beer and wine by yeasts, but he was able to show that a number of other fermentations, such as butyric and lactic fermentations, are also due to micro-organisms.

The discovery that micro-organisms cause putrefaction influenced medical research most profoundly. Suppuration in wounds had long been regarded as a kind of putrefactive process, and Lord Lister, guided by the researches of Pasteur, introduced into the treatment of surgical wounds the principles of asepsis which made aseptic surgery possible.

About 1850, Pollender found minute rod-shaped bodies in the blood and spleen of animals dead with anthrax. Soon after, Davaine identified these little rods as the special virus of the disease. He proved that the disease could be transmitted from animal to animal by means of blood containing these rod-shaped bodies, and could never be transmitted by blood from which they were absent. Anthrax, or splenic fever, was thus proved to be due to bacteria, and the name Bacillus anthrax was given to the causative germ. This was substantial proof of the germ theory. The belief is now entertained that infectious diseases are groups of reactive symptoms produced by the resistance of the tissue cells to the bacteria cells, and that the process is one in which enzymes or digestive ferments secreted by both combatants, play a most important part.

The germ of relapsing fever was next discovered, credit for which belongs to Obermeir, who in 1868, found a spirillum in the blood of patients suffering from that disease. Then followed a period of much work, and many alleged discoveries and fantastic theories, and very little advance, owing to the want of proper technic.

Robert Koch, of Germany, now took part in the work, and in 1880 introduced the technical methods which made of bacteriology an exact science and opened the door to the new science of immunology.

With the publication of Koch's work, bacteriology and immunology entered a new era. The introduction of solid culture media, methods for the isolation and study of micro-organisms in pure culture, the use and development of analine dyes for staining, by Wiegert, Koch and Ehrlich, the perfection of the microscope, and the adoption of Koch's postulates for testing the claims of alleged discoveries, were all important factors of progress. As the result of these improved technical methods half-finished work held in check for the want of proper technic was now given opportunity for development and new discoveries were rapidly announced.

Coincident with the explanation of the cause of infectious diseases and the phenomena which accompany their development, the subject of immunity or resistance to infectious diseases became the subject of researches which have led to great practical value.

More than half a century before the time of Pasteur, Jenner had succeeded in perfecting his method for vaccinating against smallpox. It was known to Jenner that the peasantry in England believed that milkmaids who had contracted sores from milking cows affected with cowpox were immune to smallpox. His investigations on this subject led to the publication of his famous monograph entitled "An Inquiry into the Causes and

Effects of Variolæ Vaccine", published in June, 1798. The evidence contained in this monograph was so convincing that within a year or two vaccination against smallpox became general over the continent of Europe.

Pasteur more than fifty years later, philosophizing on this subject, and stimulated by the brilliant results obtained by Jenner by vaccination with the entirely innocuous pustules of cowpox, realized the possibility of immunizing against infectious diseases by using weakened, attenuated, or modified infectious agents without exposing the individual to the danger of infection from the fully potent virus.

Pasteur came to the conclusion that the vaccine or cowpox is smallpox, the virus of which had been attenuated by its passage through the cow, and that, consequently, when a person undergoes vaccination, he is thereby inoculated with a benign form of smallpox. The protective inoculation against pleuro-pnuemonia, which had long been practiced, gave encouragement to this hope.

The investigations of Toussaint were of value to Pasteur in solving the problem. Toussaint heated the blood of a sheep which had died of anthrax, to a temperature of 55° C. for ten minutes, then injected it into a number of sheep. Some of the animals died of anthrax and others recovered after a mild attack. The latter were found to be immune to a subsequent inoculation with virulent blood. Pasteur concluded the deaths were due to spores which had not been killed by the heat employed. By growing the bacillus of anthrax at a temperature of 42° C. he obtained a culture of low virulence which did not form spores. When sheep were treated with this virus they had a mild attack of the disease, which rendered them immune to virulent cultures. This culture afterwards became known as Anthrax Vaccine. He tried similar experiments with other animal diseases of infectious origin, with the result that successful vaccination against chicken cholera and swine cholera were developed.

His next experiment of importance resulted in the discovery of a method for immunizing against hydrophobia. Recognizing that the infected spinal cord of an animal dying from hydrophobia is, in fact, a fully developed culture of the virus, he invented a method for attenuating its virulence. This was accomplished by drying the cord in a closed vessel over a hygroscope substance. He found that the virulence of the cord could be lessened and controlled by the drying process.

Guided by these experiments, Pasteur accomplished his purpose and gave to medical science knowledge of the methods for so modifying infective agents that when introduced into the body they produce immunity without endangering the life or the health of the individual.

Thus was born the new science of immunology which has already revolutionized our knowledge of the etiology of many of the most important diseases, and placed in the hands of the medical profession the means for artificially producing immunity against these diseases, and new and more scientific methods for their treatment.

SOURCES OF INFECTION

Bacteria pervade the air we breathe, the water we drink and the food we eat. Millions of them are taken into the nasal passages with every breath. Millions more are taken into the mouth and carried into the alimentary canal. Still further millions light upon the skin. What becomes of these bacteria?

Most bacteria when placed upon living tissues are unable to attack it and soon die; but when they are placed upon the same tissues that are dead, they feed upon it readily. When the tissues have been lowered in their resisting power by luxury, impoverished diet, enervating habits, fatigue, exposure or worry, the power of producing enzymes or antibodies which protect the tissues from the attacks of microbes is so diminished that the bacteria have an opportunity to obtain a foothold and commence to grow and multiply at the expense of the tissues themselves. They are no longer saprophytes or feeders on dead matter, but parasites living at the expense of the tissues.

*The Mouth and Intestinal Canal as Sources of Infection.** Miller, in his book published over twenty years ago, claimed to have isolated "more than one hundred different kinds of bacteria from the juices and deposits in the mouth." The staphylococcus and streptococcus are permanent residents; the pnuemococci is found in about ninety per cent. of persons examined. The streptococcus is always present.

Examination by Dr. C. P. Brown,** of the Mulford Laboratories, of the pus pockets of pyorrhea alveolaris, secured by Dr. Joseph Head, of Philadelphia, demonstrated the almost universal and continual presence of six kinds of bacteria, namely: Bacillus influenzæ, the streptococcus, staphylococcus, pneumococcus, Micrococcus catarrhalis and diphtheroid bacilli. Goadby found in the early stages of pyorrhea alveolaris, Micrococcus catarrhalis, Bacillus septus, Micrococcus pnuemonia, Bacillus necrodentalis (Goadby), streptococcus brevis, and Micrococcus citreus granulatus (Freud). In the latter stages of the disease he found Micrococcus catarrhalis and streptococci of various types. Allen† considers that the spirochætes and spirilla found in the mouth are connected with, if not responsible for, the severe anemia which is sometimes met with in cases of pyorrhea alveolaris. Cummins‡ considers the streptococci and the strepto bacilli to be the germs usually immediately concerned in the arthritic and auto-intoxication processes sometimes connected with the pyorrheal infection. Rosenberg found on the mucous membrane pneumococci, streptococci, staphylococci and various bacilli, and around or in decayed teeth organisms which belong to the class of fungi (Actinomyces). According to the same authority, yeasts and moulds may also be present, as well as the Micrococcus catarrhalis. Spirilla are not uncommonly found, especially when decayed teeth are present.

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*Miller. "Micro-organisms of the Human Mouth", 1890.

**C. P. Brown, "The Bacteriology of Pyorrhea Alveolaris", New York Medical Journal, Dec. 20, 1913.

†R. W. Allen, "Vaccine Therapy, Its Theory and Practice", Blakiston, Philadelphia, 1913.

‡Robert C. Cummins, M.B., "The Results of Auto-Intoxication Taking Place From the Mouth in Oral Sepsis, and Its Treatment by Bacterial Vaccines", Journal of Vaccine Therapy, March, 1913.

These infecting micro-organisms having learned to grow at the expense of the tissues are the causative agents in pyorrhea alveolaris and other diseases of the mouth tissues. From the mouth they may find their way into the tonsils and from this focus of infection invade the entire system.

Osler, Cummins, Murphy, Knopf, Collier, Billings, Rosenow, Mayo, Hunter, Collins, Eyre and Payne, and many other authorities lay stress upon the danger of systemic infection from septic conditions of the oral cavity, and consider the diseased condition sufficiently wide-spread and injurious to warn the profession in regard to it as a serious menace to public health.

When the mouth is in a septic condition the food may become a source of intestinal sepsis, or intestinal sepsis may arise from some other source, as for example, intestinal stasis, or, the two causes may be combined. Metchnikoff, in his remarkable contribution published in the *Revue Scientifique*, Vol. II, page 103, 1904, calls attention to the harmful action of microbes in this connection. He classes old age as a "disease originating from the insidious poisons of the vital organs of the body by toxins generated by myriads of toxigenic bacteria that infest the gastro-intestinal tract". He claims that these harmful micro-organisms can be displaced by a beneficent bacterial growth, thus saving thousands of lives and increasing the longevity of the race. His successful experiments along this line in the treatment of his own case led to his final introduction of the Bulgarian lactic acid bacillus as a therapeutic agent.

IMMUNITY

The term "immunity" signifies non-susceptibility to a given infectious agent, either under natural conditions, natural immunity, or under conditions artificially induced—acquired immunity. The term "immunity" has only *relative* significance. For example, a man or animal may be exempt from a disease under natural conditions, and yet the infective agent may be capable of producing it when introduced in sufficient quantity. On the other hand, the natural resistance to an infectious agent, even when very high, may be augmented by artificial means.

In the case of certain diseases, one attack confers immunity against another attack for many years, sometimes practically for a life-time, as in smallpox, yellow fever, typhoid fever, etc. In the case of other diseases a person may suffer from several attacks, instanced by influenza, pnuemonia, diphtheria, etc. However, in relation to the second group, experimental researches has demonstrated that in many of them a certain degree of immunity does follow; and it is considered highly probable that an attack of any acute infectious disease confers immunity for a longer or shorter period.

THEORIES OF IMMUNITY

The following theories are different methods of explaining certain observed phenomena concerning infection and immunity. The authors differ in their methods of expression, but all agree in regard to the correctness of the phenomena themselves.

Pasteur's Exhaustion Theory. Pasteur's views of immunity were based upon the supposition that the animal body was a mere culture medium for the growth of micro-organisms and that immunity was produced when the food upon which the bacteria were nourished was exhausted or used up. The prolonged absence of the proper nutritious substances would account for the more or less permanent nature of the acquired immunity. This was well known as the *exhaustion theory* and still exists in a modified form.

Chauveau's Noxious Retention Theory. Chauveau maintained that during the course of a disease the bacteria produce substances in the presence of which they cannot develop further; consequently, recovery takes place and the continued presence of these noxious substances renders another attack of the disease impossible.

Metchnikoff's Phagocytosis Theory. Before Metchnikoff advanced his theory of phagocytosis it was already known that the amœboid movements of the leucocytes enabled them to take up foreign particles into their interior. Virchow was aware that leucocytes increased in certain septic conditions; Panum (1874) and Rosser (1881) had suggested that bacteria might be ingested by leucocytes. But it remained for Metchnikoff to develop the idea that the body cells normally possess the power not only of ingesting but of digesting and destroying foreign particles and fragments of dead tissue. This process he named "phagocytosis" (from the Greek, *phagein*, to eat; *kutos*, cell). Since that time Metchnikoff has evolved his well known theory of phagocytosis

Metchnikoff believed that the enzyme elaborated by the body cells destroyed not only bacteria but their products as well, so that immunity may mean either destruction of bacteria or destruction of bacterial products. He and his followers considered it probable that the same agent destroys the bacteria and neutralizes their products.

To sum up Metchnikoff's theory, immunity does not always depend upon the same fundamental reactions. It may depend upon the incorporation and destruction of bacteria by body cells, or upon the destructive action of body juices into which the cellular enzymes have been discharged; or, when micro-organisms are not directly engaged in the production of disease, and the morbid changes result from the presence of a toxin, as in diphtheria and tetanus, immunity may depend upon the action of one of these enzymes on the poison introduced. According to this conception, therefore, diphtheria antitoxin must protect either through the action of cellular enzymes which it contains already formed, or by stimulating the formation of protecting enzymes within the body.

Wright's Opsonic Theory. Following up Metchnikoff's phaygocytic theory, Wright demonstrated that the function of the antibodies called opsonine is to prepare bacteria for ingestion and digestion by the leucocytes. The name opsonin is from the Greek word "opsono", meaning "I prepare food for."

According to the opsonic theory of immunity, there are normally in the blood, opsonins specific to each kind of disease-producing bacteria. When a germ invades the body the tissue cells immediately produce a large amount of antibodies, including opsonins. In the meantime, the leucocytes, or phagocytic corpuscles of the blood, rush to the site of invasion to repel the bacteria by ingesting and digesting them, or, in other words, eating them up. This the phagocytes cannot do until the bacteria have been prepared to be eaten by the opsonins.

Thus we see that immunity to disease germs is produced in the healthy animal body by the action of the disease germs themselves, which have the power of stimulating the tissue cells to produce antibodies. Some of these antibodies destroy the bacteria or render them inactive and others aid the phagocytes to ingest them.

Vaughan's Parenteral Digestion Theory. Vaughan teaches that infection and immunity are due to parenteral digestion. Parenteral refers to digestion carried on by the body cells outside of the alimentary canal. Bacteria are living proteins. When bacteria invade the body and become parasites, living at the expense of the tissues, the body cells finally become "sensitized" and react against them. This reaction consists in the elaboration by the body cells of a powerful, specific, proteolytic ferment or enzyme which splits up the bacterial protein into two portions, namely: a poisonous portion consisting of the archon or keystone, or central atomic group of the protein molecule; and a secondary group which is non-poisonous. The former produces the toxic symptons of the disease; the latter stimulates the body cells to elaborate more of the specific proteolytic enzyme referred to. In case of recovery from an infectious disease, characterized by subsequent immunity, the protection against attack is due to the storing of zymose in the tissues and the power thus acquired by certain tissue cells of producing enzymes promptly on re-exposure to the same infecting agent.

Vaughan†† calls attention to the fact that the protoplasm contents of the microbic cells and the body cells are living proteins, and that this fact is pivotal in the study of infection and immunity. Foreign living protein (bacteria, protozoa, etc.) can grow and multiply in the human body only if the invader is capable of digesting and utilizing the living protein of the body and converting it into the same kind of protein as that of the invader. This it is able to do only by means of its digestive ferment, and this must act upon the protein of its body cells and digest it. If the digestive ferment or enzyme of the bacterial cell cannot digest and prepare food for the bacterium from the body protein (protoplasm) then the invading bacterial cell dies. If the digestive ferment produced by the body cell is rapidly and thoroughly destructive, there is no bacterial development and the organism is innocuous. If the digestive ferment of the bacterial cell is sufficiently potent to digest the protein of the body cell, then the bacterium becomes a *parasite* and lives at the expense of the animal tissues and the result is seen in the phenomena we know as infectious diseases.

According to Vaughan, all true proteins are constructed upon the same general plan, and consist of a central group, keystone or *archon*, around which are arranged sub-groups. The central group is common alike to all proteins. It is a *poison*, but not a toxin; that is, it is incapable of stimulating the body cells to produce an antitoxin when introduced into the animal body. Its poisonous properties are due to its powerful affinity for the secondary group of other proteins. The secondary group or groups of each protein molecule is specific. The power of the protein to stimulate the body cells to produce a specific proteolytic enzyme resides in the secondary groups.

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††"The Protein Split Product in Relation to Immunity and Disease", Victor C. Vaughan, M.D., L.L.D., and Co-laborers, Lea and Febiger, 1913.

The infective agent, antigen or sensitizer, in a case of typhoid fever, is the typhoid bacillus. It is infective because by means of its digestive ferment it can feed on the protein of man's body. This means that it can convert man's protein into typhoid protein and thus multiply its kind. Moreover, it is not, immediately on its entrance in man's body, destroyed by the ferments of the body cells. Having found admission to the body it proceeds to grow and multiply. This continues through the period of incubation, which in this disease is somewhere about ten days. During this period of incubation there is no effective resistance on the part of the body cells to the growth and multiplication of the foreign protein. During this time the man is not sick, and we conclude therefore that it is not the growth of the foreign protein which *per se* gives rise to the symptoms of typhoid fever. However, during this time the body cells are being prepared for their combat with the foreign protein. This preparation consists of the development in certain of the body cells of a new function, that of elaborating a new and specific ferment which will digest and destroy the foreign protein. When this new ferment begins its action the first symptoms of the disease appear. The active stage of the disease, with its symptoms and the lesions induced, marks the period over which the parenteral digestion of the foreign protein exists. Death may come from the too rapid breaking up of the foreign protein and the consequent liberation of a fatal dose of the protein poison, which is always formed on the disruption of the protein molecule, or it may result from some lesion induced by the products of this disruption, such as perforation and hemorrhage, or it may follow from chronic intoxication and consequent exhaustion. In case of recovery, the individual is, for a time at least, immune to the typhoid bacillus because his body cells are now able to elaborate and make immediately effective the specific ferment which destroys the typhoid protein.

To this stimulating action of the secondary group of the protein molecule upon the body cells which causes the development in the body of the man of a specific proteolytic enzyme, Vaughan has given the name "protein sensitization". "There is developed in certain body cells a new function, that of elaborating this new ferment."

Certain body cells have now acquired the property of producing enzymes and antibodies promptly; the individual is therefore *immune* to further attacks of typhoid fever, because upon subsequent exposures the body cells destroy the typhoid bacillus without the production of any noticeable reaction.

Sajous' Internal Secretion Theory. Wright concluded in 1904 that the "protective substances which were involved in the cure of disease and that were present in considerable quantities in the blood were to be regarded as produced by internal secretions." He added, however, that he "did not know where they were produced in the body". Sajous had one year earlier, in his work on the "Internal Secretions", claimed that the thyroid, adrenals and pancreas were the source of internal secretions known as antitoxic, and that it was these secretions which endowed the blood and Metchnikoff's phagocytes with their immunizing power. He also claimed (1907) that Wright's opsonin was the thyroid secretion. The researches of Fassin in Belgium, and of Stepanoff and Marbe at the Pasteur Institute, favor Sajous' observations.

Sajous' theory is that bacterial vaccines excite the centers that govern the above glands, and by thus increasing the secretory activity of the latter, cause the appearance in the blood of the protective substances to which Wright refers.

Ehrlich's Side-Chain Theory. Ehrlich's hypothesis is based on the mechanism of cellular nutrition, so that, as Welch has pointed out in his Huxley lecture on immunity, the two theories have this view-point in common. Ehrlich conceives the structure of protoplasm to be extremely complicated and characterized by enormous numbers of side-chain or groups of combining molecules—a conception borrowed from the structural diagrams of organic chemistry. These side-chains—each being a definite molecular group—are supposed to have specific combining affinities. It is through the combination of particular molecular groups with appropriate groups in the tissue juices that cellular nutrition and metabolism are supposed to be maintained.

These side-chains are called receptors. Now, cells have receptors not only for substances which are beneficial to them, but also for substances which tend to destroy them. It is through these receptors that bacteria by means of their toxins and other metabolic products attack the cell. When a cell has been set upon and injured, the reparative powers of the body exercise their function and one evidence of repair is the production of more receptors. As Nature is prodigal in all her reparative processes an excess of receptors is manufactured and some are crowded out into blood and tissue juices. A large number of these receptors floating in the blood gives to the serum antitoxic and antibacterial powers.

Sensitized Vaccines. Besredka, in explaining the action of sensitized vaccines, refers to the researches of Garbat and Meyer. These investigators claim that bacteria are typical cells consisting of an external protoplasmic envelope and internal nuclear portion. When the bacterial cell is disrupted, the outer portion is digested and the inner portion set free. Both portions are toxic; both give rise to individual immunizing substances by stimulating the tissue cells to produce them. The inner portion of the bacterial cell is the endotoxin; therefore, according to this view, part of the immunizing action is due to anti-endotoxin. Vaughan explains the apparent difference between his views and those of Besredka in a communication to the author of this paper.

(*To be continued*)

MIXING TEST FOR A GOOD ALLOY*

BY DR. P. A. GOULD, GIBSONBURG, OHIO

AN ALLOY is shown to a dentist, highly recommended and much advertised. How does he judge its excellence?

There are some peculiarities that show the difference in the quality of alloys, to be noticed in the manner in which they combine with mercury; these properties vary very much, according to the metals used in the making.

Amalgams offer an excellent means of studying the behavior of metals towards each other. Amalgam is an alloy of mercury with metal or metal alloys; metals or alloys that combine with a definite amount of mercury will be found to vary in their action, according to the metals used.

The word amalgam can be applied to any combination of metals. If it be possible to hold tin in the hand the same as we do mercury in the liquid state, it will combine with silver, in the same manner as mercury combines with tin. The same is true in the behavior of gold and platinum.

A very important thing is to be noticed in a combination of liquid tin and silver mixed. The tin will take up a definite quantity, according to the heat given it. At a temperature that is half way between the melting point of both, it takes up or dissolves about sixty-five per cent. of silver to thirty-five per cent. of tin. This alloy when mixed with mercury will make an amalgam which will not contract in the setting, and expands hardly enough to be noticed.

This would make an ideal alloy, were it not for its stability. A physical property of amalgams designated as stability, or rigidity, is the flow and crushing point.

The term "edge-strength" was invented to designate the degree of resistance that an angle or edge of a hardened filling offers to an applied force which might cause it to fracture. This property of an alloy may be modified by the presence of other metals in the silver and tin, such as gold, platinum, copper, zinc, bismuth, cadmium, lead and aluminum.

In mixing tin with mercury, the tin takes up the mercury very quickly, and soon forms a spongy, springy lump that will remain in a plastic condition for an indefinite time; it soils the hands in mixing, and unless mixed very dry, will make a very sticky conglomeration such as is used in silvering glass.

Mercury has a very gravitative property while tin is just the opposite when in a liquid state. Silver also illustrates the gravitative property. In changing from the liquid to a congealed state, a globule of the molten silver will congeal on the outside first, then the liquid metal in the center will break through the surface, caused by the expansion in the setting or hardening of the metal beneath the surface.

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*Clinic, Ohio State Dental Society, Dec. 1915.

An alloy of tin fifty-five per cent. and silver forty-five per cent. takes up mercury very quickly; when mixed in proportions to make it soft enough so that upon dropping it on the table or some hard substance it will flatten and not show cracks in it, it forms a very sticky mass, soiling the hands very much. Unlike the tin mixture, which is soft and spongy, upon pressing between the thumb and finger, a little resistance is noticed and a tendency to set, or get hard, making a crackling sound on being mixed, but taking some time to set unless surplus mercury is squeezed out when the setting is hastened. This is a very poor amalgam, shrinkage 11. expansion 1. flow 28.5 and crushing strength 222.

Silver forty-five per cent., tin fifty-two per cent., zinc three per cent. We have here practically the same mixture of silver and tin modified with a little zinc. This does not mix as easily with the mercury. When enough is mixed in to make it plastic enough to drop and flatten out without breaking, a slight heat is noticed in working it between the thumb and finger; also a tendency to set very quickly. The sticky daub is very much in evidence in mixing when soft, and it soils the hands. This alloy makes a very poor amalgam owing to the variation there may be in shrinkage and expansion.

When it is annealed the shrinkage is increased. It does not set so rapidly, mercury may be squeezed out after the soft mix is made, and the alloy can still be kneaded in the hand, worked up quite soft. Upon returning the mercury squeezed out, it becomes very smeary and sticky, soiling the hands a great deal. The tendency to get hard like the fresh-cut is lost. While lying on a cold slab for a few minutes it becomes crumbly, but on mixing in the warm hand it will become plastic again.

Silver sixty-five per cent., tin forty-three per cent, copper two per cent. Expansion and shrinkage will vary with this alloy according to the way it is put in the cavity. By using all the force possible and cutting out all soft material, a perfect filling may be obtained. The mixing will have some characteristics of a good alloy. The mercury is taken up very quickly like those of silver and tin unmodified; it makes the hands very dirty; sets very quickly, and has the property of taking up more mercury like the gold alloy after it has commenced to set.

Silver sixty-five per cent., tin thirty-five per cent. Expansion 1, flow 3.67, crushing point 290. This is a good alloy for all reasons and sets well, but lacks edge strength. It is what is considered one of the best alloys; is to be judged by its white color, fine grain and tendency to set quickly. Mercury may be added to keep it from setting and this can be continued for some time without its getting sticky. It soils the hands some and is the only alloy the writer has become familiar with that he can recommend for a filling that does this, except a copper alloy, which is hard to handle and work right even when the operator knows just what he has got, but he often has to depend for his information solely upon what the man who sells it to him says.

Silver seventy per cent., tin thirty per cent. Expansion 14, flow 3.44, crushing strength 316. A tin-silver alloy with the same properties in the mixing, will take up a little more mercury than the sixty-five per cent. silver and thirty-five per cent. tin, sets hard and quickly, and edge strength is greater, but has the disadvantage of too much expansion. It is not likely that a dentist will ever be asked to purchase an alloy of this per cent. of silver unless he has it made to order.

Silver sixty-two per cent., tin thirty-three per cent., lead five per cent. Expansion 1, flow 4.88, crushing stress 290. This alloy is equal to the sixty-five per cent. silver and thirty-five per cent. tin, having exactly the same properties with less silver; a very slight difference in the flow, mixes the same, and can be detected by the greasy black lead on fingers and hand.

Silver sixty-one and one-half per cent., tin thirty-three and one-half per cent., zinc five per cent. Annealed, expansion 9. flow 2.07, crushing stress 345. When this alloy is fresh-cut it has an expansion of 68. This is the best alloy, aside from a gold alloy, but its expansion has to be considered in putting in large fillings. The hand is not soiled in the mixing, it takes up the mercury very slowly, and is about medium setting. More mercury added after it commences to set, stops the setting very noticeably.

Gold five per cent., silver sixty-two per cent., tin thirty-three per cent. Flow 4.62, crushing strength 330. This is considered to be the best alloy. It mixes very easily, and is to be judged by its great affinity for mercury; setting very quickly. It has a good edge strength, does not soil the hands in mixing; has a greater flow than the zinc alloy, but its expansion is only 1 compared with that of 9 in the zinc, which is very much in its favor with large fillings.

All metals in a liquid state have the power of dissolving certain other metals that are solids at the temperature of the liquid metal. The amount dissolved is governed by the temperature at which the metals are worked together. This is why there is a decided advantage of mixing an alloy in the hand. When done with a little friction the temperature can be raised to that of the blood and body and a saturated solution that is adapted to the place it is to be used is obtained. Alloys that are mixed to a saturated solution at a temperature half way between their respective melting points, make the best alloys.

This method of making alloys would be very slow, and is not necessary only as a proof of the best formulas or proportions to use.

The way to mix an alloy with mercury may vary in different formulas, that the best results be obtained in their use. The manufacturer's instructions for working their alloys should be followed. The alloys used to demonstrate this clinic, were made by the clinician.

Connecticut Northeastern Dental Association

The Northeastern Dental Association will meet at Foot Guard Armory, Hartford, Conn., on Oct. 11th, 12th, 13th, 1916. A very interesting meeting is being planned and a large attendance is expected.

Alvin A. Hunt, *Secretary.*

DIATORIC TOOTH USED AS A MOLAR CROWN*

BY DR. E. D. HUNT, MT. VICTORY, OHIO

DEVITALIZE AND TREAT the tooth in the usual manner; fill canals with some good, permanent filling. Then select a diatoric tooth of proper shade to match the teeth in the mouth, and one that is large enough to cover the circumference of the root, being careful that the tooth is wide enough to get good, close contact points with adjacent teeth. Cut the old crown off just a little below the gum line on the buccal side. Use judgment as to how low the lingual side should be cut, as to length of tooth, amount of decay, etc. Then use a large new stone, one with a good true face, so as to get a true flat surface on root. If there is any restoration cut it down to a solid floor, square the pulp-head chamber as in preparing a cavity for an inlay.

Now grind the selected tooth to a good joint on buccal side; but very little grinding if any is needed to be done on the lingual. After you have the tooth almost articulated, place the tooth on root and use a piece of articulating paper between bite, and grind where indicated. This will give a better occlusion.

Warm a piece of matrix wax and press tightly in root. Warm the tooth and place it on the wax; then with a square-end spatula place it across the joint of tooth and root on buccal side and have patient bite while crown is warm. The spatula holds the tooth in place when pressed in to the wax. Warm the tooth with hot air, place a piece of cotton on top of tooth and have patient bite again; take a warm spatula and go around wax line. Chill with cold water, trim off the excess wax and put back in place. With a wide, warm spatula go around wax line carefully, so that when you lift the waxed crown off, the keen sharp line of the root will be in the wax.

Before setting the crown, undercut the socket in root and groove the post. Invest the crown edgewise (not flatwise) in the investment and heat over a low flame just hot enough to melt the wax. Don't burn it out as there is danger of checking the tooth. Cast with acolite or Watts metal. You can finish the tooth in the fingers so there will be very little, if any, finishing to be done after being set. You thus have a crown far superior to a gold crown in appearance and durability.

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*Clinic, Ohio State Dental Society, Dec. 1915.

> Thy friend has a friend, and thy friend's friend has a friend; be discreet.—*The Talmud.*

PRESIDENT'S ADDRESS*

BY J. K. DOUGLAS, D.D.S., SANDUSKY, OHIO

IN ORDER TO MAINTAIN the long established custom of this association to have an address by the president, I will try to uphold this custom, though briefly, as there are papers and discussions that will be of more value to you than an address by your president.

I want to express my appreciation and thank the association at this time, for the many courtesies I have received and the honor you have given me by electing me president.

I also want to thank the members of the executive council and the various committees for their cooperation to make this a successful meeting.

We hear a great deal of the wonderful advancement that has been made by our profession in the last few years, which is very true, but let us not forget that one of the greatest moves for the progress of the profession was made about sixty years ago, when those few men assembled and organized this association in order that they might be able to exchange their various methods and operations. Prior to that time many men kept their technic a secret, and were fearful lest their fellow practitioners might learn their methods of operating. Today we find men ready to make many sacrifices and travel to almost any part of the world for the benefit of their fellow practitioners and the good of the profession.

This and other organizations have made it possible for the profession to advance. These organizations have made it possible to have better dental legislation, better colleges, better men in the profession, and better standing among our fellow men.

It is the result of organization that made it possible to have an institute here in this city for dental research work. At the time of the organization of this association, the field of dentistry was small compared with the field today. The science of bacteriology was limited and little or no attempt was made to prevent or cure infected tissues, as bacterial infection was unknown; as a result all pulpless teeth were sacrificed. The knowledge of pathology was limited, materia medica consisted of only a few drugs, very few men used anesthetics, and Reontgenology was unknown. With all the modern and scientific methods we have at the present time it would seem that the practice of dentistry should be very simple compared to the early days, but the field of dentistry has advanced also, our responsibilities are greater and the dentists are expected to render services that only a few years ago were unheard of.

Not so long ago the care of the teeth was considered by many to be a luxury, while now, through the profession, the people are being educated in the results of oral hygiene and preventive methods until it is a necessity, and dental services are demanded in nearly every better health movement. In the schools, in the factories, in the army and navy, in nearly every institution, preventive methods are being forced not only as a safeguard to health, but for efficiency.

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*President's Address, Northern Ohio Dental Society, 1916.

It is considered so important that in many places the indigent are being cared for either by philanthropic methods or by the municipalities, and it is up to this profession to be prepared to educate the masses, not only by the instructions given to our patients in daily practice, but we must be prepared and ready to aid in every way public health and public welfare movements.

We should be able to go before the laity and lecture and demonstrate the necessity of mouth hygiene for the prevention of disease. The dentist must be alert to the modern methods which are constantly being advocated by the profession, and be able to put into his practice those methods which will benefit both himself and his patients.

Our work cannot be standardized and operations which were considered of great value a few years ago have become almost obsolete, and it is fortunate in a way that such is the case, if it were not, we would be unable to progress, and necessarily would be at a standstill. Our field has become so large that those of us who are so situated, that we must conduct a general practice, cannot be proficient in all lines of work, and much better results would be obtained if we could select the line for which we are best adapted or which appeals to us most, systemize a technic, and specialize.

It is not only confusing but sometimes discouraging to many who hear papers read and discussed at our meetings, condemning certain methods which we have been using (successfully as far as our ability will allow us to judge) and are told that they have no place in dentistry, etc. I believe that the success of any method of operation depends very largely upon the details of the technic used in its construction, and where many have failure, it is due either to carelessness or inability to carry out the required technic.

For an illustration we may take the gold shell crown, which was used extensively for a few years, and I may say, too extensively, is one of the most abused and one of the most horrible restorations practiced from an esthetic or sanitary standpoint unless proper judgment and most careful technic is carried out. Then it becomes a very creditable restoration and is most valuable in some cases. What the profession needs more than anything else today, is to do more studying and more thinking to be able to comprehend the conditions which are constantly presenting themselves. It has been considered best for the dental colleges to add one more year to the course of study, so that in the future we will have men who are educated sufficiently to be able to take up all matters pertaining to dentistry and solve them in a scientific manner creditable to the profession, and we who have been out of college these many years, must do more studying than we have been accustomed to do in the past or we will go to the meetings and hear papers discussed which we will be unable to comprehend, and we will be in a class with some that we know today who, when they have heard an essayist, remark that they do not care for the highbrow stuff, usually, because it is too scientific, and some one is getting the "dry rot." It is necessary in order to keep up with the latest methods to form study clubs and do special work.

Another phase of the profession which has progressed quite rapidly and one that has received very little thought in the past, is the business principles of the practice of dentistry. As a rule the man who chooses dentistry as a profession has had little if any business training. He goes into the high school from the grades at about fourteen or fifteen years of age and finishes the course in four years, then goes to his dental college, at the age of nineteen or twenty, where he spends three or four years, and receives his degree, at the age of twenty-three or twenty-five, and immediately chooses his location and goes into business without any idea of business principles. He never has had any practical business training and he has not had any taught him by his school. The time is past when we are expected to practice dentistry for the sake of humanity alone, and it is very necessary that these principles be taught in the colleges. The young man out of college who is fortunate enough to associate himself for a few years in an office with a dentist who is conducting a practice along modern business methods, one that is operated for efficiency, will be better prepared practically and in a short time will be repaid financially, regardless of any compensation he may have received in the office during the time spent there.

The man who makes a promise which he does not intend to keep, and does not try to keep, should rightly be adjudged to have forfeited what should be every man's most precious possession.—*Exchange.*

It is in *this* time we are to live, and no other. Let us humbly, tremblingly, manfully look at it, and we shall not wish that the sun could go back its ten degrees, or that we could go back with it. If easy times are departed, it is that difficult times may make us more earnest; that they may teach us not to depend on ourselves.—*F. D. Maurice.*

COOPERATIVE RESOLUTION*

BY A. R. ROSS, D.D.S., LAFAYETTE, IND.

THIS IS A RESOLUTION which means just what it says, a cooperative resolution, a Cooperative Help Bureau to be established through the office of the secretary of this association, that will render what we hope will be a service that will be worth while to our members. If experience demonstrates that there is not a sufficient demand for the service to merit its continuance, it can easily be dropped, as it does not involve any change of the constitution.

"*Be it resolved* that the Indiana State Dental Association establish a department of cooperation to be managed through the office of the secretary; and be it further resolved that this department of cooperation shall serve the following purposes:

First: Provide licensed dentists to manage the offices of members of this association during their enforced absence on account of ill health."

If a man is suddenly taken with appendicitis, or any sickness, is there any reason why we cannot establish a help bureau to try to furnish him a licensed dentist, some young man who is not yet located, to step into that office and keep that office opened until the member is ready to renew his practice?

Second: "To provide licensed dentists as assistants to members of this association."

In the event that a member becomes rushed with work, and wants an assistant, he can write in and ask for one.

Third: "To assist in locating recently licensed dentists who have joined this association in communities which are not already over-crowded."

There is probably not a man present who would not have valued it at the time he graduated had he access through an association to some definite information that would lead him to seek a location where there were not too many dentists, but rather to go to some other locality where the number was fewer.

Fourth: "To assist, through correspondence, in the disposal of a deceased member's equipment to a recent dental graduate who is in search of an equipment."

I have assisted in taking an inventory in two different cases of deceased practitioners in my own locality, and under present conditions the equipment is practically a dead loss. A member may die with a very excellent office equipment, and the dental supply people cannot give much for it, because they must sell it as second-hand material, and they must discount it, must offer it to their customer at a heavily discounted price. But if the members of our association in that locality would notify the secretary of the death of this member, and one or two members would volunteer to the members of the family of the deceased member their services in taking an inventory, and then if we could get in touch with some recently graduated, licensed dentist, in search of an outfit, some man who could not afford to buy a new equipment, but who could afford to pay more than could be paid by the dental supply house for that equipment, we would be aiding the family of the deceased member in realizing something from this.

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*Presented and adopted at the Indiana State Dental Society, 1916.

"*Be it further resolved* that the secretary of this association shall keep a list of licensed dentists, members of this association, who are available as substitutes, assistants or purchasers of office equipment, and that this list shall be maintained as accurately as possible."

That will not be easy. Before presenting this I took the matter up with the dean of one of the dental colleges, with the heads of a couple of dental supply houses, and they assured me of their hearty cooperation, the dental supply people of helping me maintain a list of the correct addresses as far as possible, and with the addresses of the recent graduates. The deans of the colleges will give me a list of recent graduates, and we will get in touch with the respective dental colleges in the immediate territory surrounding Indiana also, and try so far as possible to maintain an accurate list that will be available to the members of the association at all times.

"*Be it further resolved* that the members of this association shall assist the secretary by notifying him of the sickness, death, retirement or removal of any dentist in their respective localities, and that they shall further assist in making an inventory and cooperating in the disposal of a deceased member's office equipment."

The secretary can do nothing, of course, along this line without the cooperation of the members. The local dentists must initiate the service before the secretary can offer assistance.

"*Be it further resolved* that this service shall be furnished free and be limited to the members of this association."

It will be furnished free, because this association is not a money-making proposition. The only thing we try to do is to break even. We limit it to members, because entrance to this association is by no means difficult, and we are not running a philanthropic institution, but hope to have something here of service to our members.

"*And be it further resolved* that this association, through its secretary or other members involved, will not assume any responsibility for the character or professional ability of dentists furnished through this service though care will be taken to protect the interests of all parties concerned as far as possible."

As this must be done wholly by correspondence, recommending men we may be entire strangers with, no one can assume the responsibility for their professional ability or character, though we will try to get definite information on them from the deans of the respective colleges who submit these lists.

REPORT OF LEGISLATIVE COMMITTEE*

BY CHARLES SWOPE, D.D.S., CHAIRMAN, COLUMBUS, OHIO

AT THE LAST MEETING of this society a task was placed upon the legislative committee. This duty was to write and place upon the statutes of Ohio a new dental law, and in assuming this duty we realized that the work was not an easy one. We at this time beg to place before the society the result of our work for criticism or approval.

First, we succeeded in our humble way by having the most hearty cooperation of this society and the component societies. It was the work of the components that helped us along; and I, as chairman of this committee, wish to thank them for their immediate assistance all through the legislature, it being plainly shown that we as an organization *can do things.* Without your cooperation we would have gone down as if struck by a submarine.

I also want to make the following mention at this time, because I think these parties deserve due recognition for their very valuable services. It has often been said that "we never know the true worth of a man in public life until after his death", but I am glad to say in this instance that the old man with the sickle has spared this one and we are finding out every day that this one man was on the job for the good of our profession. It pleases me as chairman of this committee to commend the services of Dr. Halston Bartilson and pay him tribute at this time for the valuable data furnished this committee.

We are indebted in a great measure to the Ohio Health Federation, whose secretary, Mr. Sheridan, lent every aid he could in that capacity; to Dr. H. C. Brown, as member of the Ohio Health Federation and also as member of the State Board of Health, for his active interest in our behalf; to our secretary, Dr. Chapman, who was always ready in his official capacity; and to our president, Dr. Mills, who sacrificed his private interests and gave his time at all times when he sighted a periscope on the waters.

I must mention at this time the names of Dr. Tremper and Dr. Bauer, dentists, who being members of the Senate urged the necessity of passage of this Bill, and also to the medical profession which was well represented as members of the last legislature, for their active interest, and especially may I mention Dr Ellis and Dr Hoy who certainly gave us the brotherly hand.

Now gentlemen, above all whom I have mentioned I want to say again that it was the work of the Component Societies where we derived the greatest benefit; it was the work of the Component Society that put the bill through the Senate without a dissenting vote, and it was the work of the Component Society that put it through the House without one dissenting vote.

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*Read before the Ohio State Dental Society, Dec. 1915.

Senator Lloyd, the father of this new Dental Law, said to me after the passage of it, "Now, Doctor, you have a new law and a good one, but it is of no value unless you enforce it". I am informed by our secretary of the state dental board that there is no appropriation for the expenses of prosecution. Any court costs, expenses of witnesses or investigation expense which might occur must be paid out of individual pockets. It is the limited finances that prevents the enforcement of this law, so I am informed by the secretary. I also want to inform you of our relative standing as compared to the other professions:

The budget of 1915 allows the

Secretary of Health Board	$3500
Medical Board	2800
Pharmacy	1800
Embalmer	900
Veterinary	1500
Dental Board	600

These Boards are also allowed a certain amount for office rental—an item which is not allowed the dental board. The dental board finds the violations so great that it is impossible to handle and prosecute them without funds. I suggest that this body take this matter up at once, appoint a committee to wait upon the state finance committee and see if we cannot be helped along this route. I have no doubt but these gentlemen will see our necessity at once and very willingly correct same.

The college credentials have, I think, under this new law brought Ohio up to a good standard. Some other provisions in this law, as all of you are familiar with, are now being tested in the courts. I thought by this time we would be able to give a report on the same, but the supreme court has not acted as yet. Ohio has been a safe refuge for incompetent dentists from every state, due to her lax dental laws; this condition has been further augmented by poorly equipped and irregular private dental colleges within the state, and in many cases abetted by an anemic alumni of these senile institutions.

In our feeble way in the new law, if you will pardon the trite but slang expression, we attempted to "Put Ohio on the Map", but new dangers beset us; there appears to be a well-organized effort to defeat the object of this law; courts have presumed to set the standard of efficiency and in many cases violations of the law have been dismissed or sentence suspended, and I urge that the members of the society shall not submit to the shackles these pirates are trying to force upon us.

Come right to the point. Present your case, plead your cause, and do it quickly. Better ten short, pointed, practical articles than one long and attenuated one in which the moral of the helpfulness is lost in a maze of words.

PERSONAL EXPERIENCE WITH SILICATE CEMENT

BY DR. A. OSGOOD, BATH, N. Y.

IT HAS BEEN the habit of the writer to wait for others to find the weakness of the many great and good things that, from time to time, have been offered for our benefit.

In 1905 I began to see mention of a new filling material called Ascher's Artificial Enamel, but was not greatly impressed, having had experience with many "promises" that failed to give permanent satisfaction. Finally, a dentist in whom I could rely, informed me that he was making use of it in his practice, thought well of it, and advised my giving it a trial, which I did, in the latter part of the above year.

It was not long before it became apparent that we had, at last, a material far better, especially in the front teeth, than anything heretofore within our reach. At that period, having been in dental practice nearly fifty years, the filling of teeth with gold was becoming a very fatiguing process, and my desire to be relieved of it was encouraged by the faith that began to be created in the new cement; but it was not without much anxiety that I examined my silicates on return of my patients after a few months. All went so well that confidence was gained, so much so, that gold filling was quite abandoned, and my patients shared my satisfaction.

It was soon found that many anterior teeth, that were too frail for gold, that had been carried along with the old cements and gutta percha, some of them for years, could be restored, in form and color, so as to present a natural appearance. The idea was to avoid crowning, and I *now* have the pleasure of seeing most of those teeth doing business, and a comfort to the users.

From my earliest experience in dental work, a faithful record of all fillings has been kept—when and where it was done, what with, and all particulars necessary, so that any question arising can in a few moments be answered, either to the patient or myself. Such a record is of much real value, and its loss would be regarded a calamity.

From November, 1905, to December, 1912, 1,453 of the old Ascher's Enamel fillngs were placed. In these years it was found that this cement, as then made, had serious defects, and something better was looked for. A dentist in whose judgment I had confidence advised a trial of Schoenbeck's cement, which was selected, and found very satisfactory. It was but very few of the Ascher fillings that had to be replaced, and the trouble was that the powder was lacking in fineness, which gave a coarse surface; and in some mouths there was a tendency to become yellow by age. Schoenbeck's was a favorite until the *new* Ascher's appeared and was thoroughly tested. It has, so far, been up to expectations, and it is with confidence patients are told they will be satisfied that a good material is being employed.

From nearly the first of my silicate work I have used only as a matrix, for that class of fillings, a material called Iridiumoid Backing. It is thinner than the celluloid strips sold for that purpose, and can always be inserted between any two front teeth, without their being separated. Its great advantage is that it bends very easily, and being without spring temper, it will remain as bent; so, when placed where a proximal cavity is to be filled, the outer or inner end, as the case may be, can be bent away from the cavity, where it will remain, leaving an opening that forms a good receptacle for introducing the cement to all parts of the cavity, when it can be shaped to the tooth with thin steel instruments, while it is yet in a plastic condition. The matrix should be left in position for a short period, when it can be removed easily.

When the filling is fully crystallized, it can be formed to the shape of the natural tooth by using the blades of sharp steel tools, all of which should be done with much care. After finishing with the chisels, cocoa butter and a burnisher is applied. With pliers and bibulous paper the cocoa is removed, when one or two applications of a thin mixture of Canada balsam and chloroform are made, when the operation is completed.

The mixing of the cement is done with a bone spatula on a slab of agate, and for introducing and packing, always, steel instruments. The fear of steel left me long ago, but strict cleanliness should be observed.

The rubber dam should always be placed when a silicate is used. It is never necessary to apply, for any of the anterior teeth, a piece more than from three to four inches square. Four or five holes should be made in the dam, for the exposure of the teeth. After adjusting the dam and holder, a small napkin, folded once, should be placed over the lower lip, and the edge of the dam drawn over it and held there by a light rubber-dam weight, when the saliva ejector is introduced, and the patient is in a fairly comfortable condition. The cavity should be carefully protected from moisture for the full operation, before the mixing of the cement. The large percentage of cavities are proximal in the anterior teeth and a matrix is usually required. When there are two proximal cavities opposite each other in the front teeth, it is better to fill only one, removing matrix, finishing it, then replace matrix, and fill the other. In this manner the original form of these teeth can be entirely restored.

The matrix material referred to can be procured from any dental supply house, or from the manufacturers, Lee S. Smith & Son Mfg. Co., Pittsburg, Pa. The cost is one dollar for three sheets, three inches square, ready to be cut with scissors into shape for matrices. The expense is very light. One purchase has been sufficient for the use of the writer up to the present time. Have never known a filling to be discolored by its use, and it is in every way recommended. Order Iridiumoid Backing, one package.

COLORED MODELS REPRESENTING VARIOUS STAGES OF GINGIVITIS*

BY LOUIS M. PAGELSON, DETROIT.

These models are to represent various stages of gingivitis but no pyorrhea. I brought these instruments because I strongly believe that a man in general practice beginning to practice prophylaxis should not have too many. Get them as you feel the need for them. These three instruments are indispensable to me, the two Tompkins scalers and the sickle.

Every case that comes to your office, that has not been treated in a couple of months, needs treatment; you may think that the mouth looks perfectly healthy but examine.

Very gently pass a scale up under the free margin of the gum, but use no force or you may do a great deal of harm. If the tooth is perfectly smooth all around, pass on to the next one, but if not make it so.

When buying new instruments be sure to grind the corners round so there will be no sharp corners to scratch. Use the instrument gently but firmly and be very thorough. Thoroughness is the key note to success but always remember that you are working for a living patient and be gentle.

One of the points so often overlooked is the proximal space, the spot where tartar seems to prefer to lodge, also the spot that is not usually kept as clean as the rest of the mouth. A sharp slender instrument like the sickle is what I prefer for this, but be very careful not to tear the tissue. We are trying to build up, not tear down.

When all the deposits are removed, polish with the orangewood stick and the ribbon floss and pumice—flour of pumice, not the commercial.

There is another class of cases that you get that looks like that—like a case of gingivitis—a little swelling, and a little recession. No deposit to be seen and even with the scaler you may find little. They are cases due to a hyperacidity and usually the tooth is roughened quite a bit at the gingival. Treat the same as you would for gingivitis and the case will become healthy very quickly.

The lingual surfaces of the upper central incisors need very careful watching. The gums may look fairly healthy and yet conceal deposits on the teeth and even pyorrhea pockets. So do not forget to examine these surfaces always; also remember that there are four surfaces on all teeth and five on the posterior. Always polish the sulci as a preventive.

If every case of gingivitis is taken care of, there will be no pyorrhea. Treat every such case carefully and your fingers will gradually be trained for the more severe cases, and also you will not be discouraged because every case carefully and thoroughly treated responds.

Given as a clinic before the Michigan State Dental Society, April, 1916.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

Polishing Gold Crowns

An old pair of rubber dam forceps with the ends filed off, and a small piece of thin rubber tubing let over each end, makes a good instrument for holding hollow metal gold crowns for polishing, etc.

—*William A. Love, B. D. S., Yass, N. S. W.—Commonwealth Dental Review.*

Repairing Hole in Gold Crown

If in the finishing process a hole is made in a gold crown, paint the outside with a thin mixture of whiting, except around the hole. Plug the hole with gold foil, touch it with a drop of borax water, and put a bit of gold solder inside. Fuse with blowpipe, and success will be obtained.—*Oral Health.*

Silicates and Humidity

We were informed that humidity affected the setting profoundly, and a complicated apparatus was rigged up in which the mixing was to be done. The fact is that humidity affects the setting very little, but the temperature does. A chilled slab in warm weather is all that is required.—*Dental Quarterly.*

Inserting Silicious Fillings

To get the best results a mixing bottle should be used with a thermometer inside whereby the desired temperature may be maintained by filling the bottle from the hot or cold water at the wash-bowl. When inserted the hardening process may be hastened by flowing hot paraffin over the filling. All such fillings should be kept free from moisture till the chemical combination of the ingredients is complete.

—*Edmund Noyes, Dental Review.*

Contouring Silicate Fillings

Where large contours are to be built, the strip, if wedged tightly at the cervix, and drawn taut, will give a flat restoration devoid of proper form and contour, and without contact point. In these cases the heavier strip is used, and a depression "worked or burnished" into that portion opposing the cavity, with a pair of ball-nosed pliers, of size and depth that will assure sufficient bulk of filling to full contact with the adjoining tooth. Even if not quite the proper form, the filling after hardening may be shaped up with stones, disks and strips, to fully restore the original tooth shape.—*Dental Quarterly.*

Polishing Amalgam

Without this last part being performed, I look on the work as being on a par with a wooden horse being left unpainted—in plain language you have not finished your job, and are not entitled to payment. I use fine finishing burs, disks, and strips to smooth the surface up; then follow on with a mixture of fine pumice powder, glycerine, and tooth paste applied with a stiff bristle brush on the engine—this giving a fine, slightly polished surface. Lastly I give a high polish with a softer brush charged with whiting and water paste.—*P. A. Mathews, Australian Journal of Dentistry.*

Finishing Amalgam

Proceed to carve up the partly set amalgam, using spoons, discoids, etc., reproducing the cusps, grooves, contour, and contact point of the original tooth, making due allowance for any abnormalities of bite. Again, do not attempt to reproduce prominent cusps and deep grooves when the other teeth in the mouth have flat table-land type of occlusal surface—have your finished sculpture in harmony with its surroundings. Test your filling by allowing the patient to gently occlude, to see that the bite is not too high at any spot. Do not allow him to quickly and forcibly close on it, lest the semi-plastic mass be squelched down and distorted, perhaps opening up at the margins.

—P. A. Mathews, Australian Journal of Dentistry.

Hypersensitive Dentin

Nothing, in my experience, approaches Dr. Dalmas' Nervocidin, manufactured at Fiume, Austria. So long as this most powerful anesthetic is used correctly, nothing but good will result. Its application in teeth causes a slight indescribable irritation or itching sensation not hard to bear. From twelve to forty-eight hours after application, the most hypersensitive dentin may be painlessly excavated. The duration of application must be governed by depth of penetration deemed necessary. Care must be exercised. The cavity should be dry and the dressing thoroughly sealed with cement, and subsequently coated with a waterproof varnish. Any stopping containing gutta percha is contra-indicated as a sealing agent.—*L. W. St. George, Commonwealth Dental Review.*

Silver Nitrate for Superficial Caries

I know of no better treatment while the caries is superficial in character than to take an orangewood stick in a port polisher on your engine and thoroughly polish the spot, then would I apply nitrate of silver with an orangewood stick, using the stick to rub the nitrate into the spot well. I do not approve of this method on permanent teeth. I have used it on a number and found that same black spot put there by the nitrate as much as seven or eight years afterward, but be it said in the favor of the treatment, that there was not the least sign of recurrent caries.—*L. B. Torrence, Dental Review.*

Draining an Abscess

A dento-alveolar abscess cannot be properly drained except by puncturing the external alveolar plate, and this is what Nature does when she forms a fistula. The proper place to puncture the alveolar plate is immediately opposite the apex of the root that is involved. This may be done in a moment with a spear-pointed drill, under local anesthesia. Such drainage is efficient and gives immediate relief. Unless drainage is complete, and can be so maintained, it is better to remove the tooth and curette the abscess cavity, removing all diseased and infected tissue.

—John S. Marshall, Pacific Dental Gazette.

Protecting a Lancet Blade

It has been recommended for a long time to protect that part of a lancet blade not needed in lancing the gums for both adults and especially children by wrapping it with gauze leaving only the end of the blade exposed. Any sudden movement of the patient would not then endanger the soft parts. Protecting gauze, thus applied, is difficult to keep in place, and, unless tied with thread, may loosen and be a source of annoyance. A much better plan is to cut a Johnson cotton roll slightly shorter than the blade and press the blade through the center of it, exposing only what is required at the end. The roll holds tightly on the blade and can be safely pressed against the lips or cheeks to hold them away while the point reaches the spot required.

—Exchange, Pacific Dental Gazette.

To Detect Loose Bands

The teeth upon which bands have been placed may be easily isolated by the aid of cotton rolls. They are then dehydrated, and with a medicine pen point, diluted tincture of iodin is carefully worked about the band, and if the cement does not obstruct, the thin liquid will seep between the bands and teeth, the brown color being readily discernible.

—*C. M. Gearhart, Dental Cosmos.*

Care of the Teeth in Pregnancy

The pregnant woman can be saved much pain and destruction of her teeth if she begins to care for them as soon as conception is known. In this enlightened day a good obstetrician advises an examination of the mouth of his patient as soon as she comes to him, because he realizes that the healthy mouth of the mother helps to produce a healthy child.—*M. Evangeline Jordan, Dental Cosmos.*

It is a well-known metallurgical fact that if any carbon comes into contact with iridio platinum it causes it to become very brittle. If you are soldering, boil all your wax off first.—*Mr. Aird, Australian Dental Journal.*

Recipe for adhesive wax: Melt together 3½ oz. white wax, 1½ oz. gum dammar, and add ½ oz. rosin. Allow debris to settle and pour into shallow metal box.

—*J. R. Burgess, Oral Health.*

Heater for Water and Spray Bottles

Get an aluminum pan about three inches deep and six to seven inches in diameter (with straight sides if possible). Cut a hole in the side large enough for an electric light receptacle to go through, cut holes in bottom of pan for your glass of water and spray bottles. Put a four-candle power carbon lamp in the receptacle and turn on the juice, and you will have warm water all day long without further bother.

—*Edward T. Evans, Decatur, Ill., Dental Review.*

To Finish a Silicate Filling

We are told that the last thing to do to a synthetic filling before leaving it for the first setting is to "puddle" it by patting. This same result may be accomplished without touching the filling, by gently tapping the tooth.

—*J. F. Nelson, Chicago, Ill., Dental Review.*

To Lessen Contraction in Inlays

A great deal of trouble with the casting of large M. O. D. inlays may be avoided and cervical deficiencies eliminated by placing two sprues into the wax pattern, one at the mesial, the other at the distal marginal ridge. The writer's theory for this technic is that the intervening occlusal area of molten gold is kept cooler than the sprued portions; hence there is not the tendency to contraction at the centre of the cast (occlusally), with a consequent drawing away from the gingival floor of the cavity of the arms of the inlay.—*M. Hillel Feldman, Dental Items of Interest.*

Hospital Patient Refused Dental Treatment

Dr. J. A. Bothwell, in charge of Dental Services, Toronto General Hospital, reports that a ward patient, suffering from stomach trouble, was recently peremptorily discharged from the hospital because of refusal to allow the hospital dentist to put his mouth and teeth in a condition of health.—*Oral Health.*

Cotton Rolls for Use with Broach

Cut cotton rolls about an inch in length. With a pointed instrument punch center of roll to make it protrude at the opposite end and from this end pick the admirably long and clean fibres for winding on broach.

A convenient holder for above cotton rolls to be worn on the little finger of the right hand consists of a cheap finger ring—wedding ring form. Cut through one side to make it adjustable in size and round and polish ends. At point opposite cut in ring solder at right angle a plate of German silver 1 inch by ¼ inch; attach to this plate a pointed wire or pin which will engage side of cotton roll holding it in readiness to pick therefrom the fibres with the left hand.—*J. T. Search, Onarga, Ill., Dental Review.*

Indications for Partial Plates

A large number of cases have come under my notice where a bridge has been inserted on one side of the upper or lower jaw, leaving the other side without teeth. Bridges are not inserted on both sides for the reason that one side lacks a posterior abutment. In such cases bridge-work is contra-indicated and under no consideration should anything but a partial denture be inserted, restoring the proper occlusion and bite at one and the same time.—*J. E. Nyce, Journal Allied Dental Societies.*

Prophylaxis vs. Cleaning Teeth

If you can disabuse the patient's mind of the idea that you are merely cleaning teeth, when you are really conscientiously curing pyorrhea, you will have advanced a long ways toward securing a greater appreciation of your services. That subject of cleaning teeth is never mentioned in my office. I want patients to clean their own teeth. In doing pyorrhea work you are doing more than merely cleaning teeth, and having this thoroughly impressed upon the mind of the patients at the start causes them to better appreciate your services.—*J. P. Buckley, Western Dental Journal.*

Prophylaxis and the Contact Point

How many of us think it necessary to carefully examine and restore faulty contacts as a routine prophylaxis procedure? And yet without it prophylaxis is not prophylaxis for it does not prevent. Of what use is it to carefully plane and polish the proximal surfaces of the teeth if with the next meal the interproximal space is left wedged with fermenting food stuff to immediately begin re-etching those surfaces? Unless these contacts are restored and every other source of mechanical and infectious irritation is removed there is no use wasting time on the preparation of the root surfaces.

—*G. C. Bowles, Michigan Dental Journal.*

Sterilization of Oral Cavity

1. Sterilization of the oral cavity with any of the commercial dental preparations or any antiseptic, in the strength in which it can be employed with safety, cannot be accomplished.

2. The cleansing of the oral cavity with an antiseptic solution alone or combined with the mechanical effects of the tooth brush, powder, or paste, reduces the number of oral bacteria approximately about 50 per cent. The claims made for the antiseptic strength of certain commercial preparations are, by actual tests, wholly unwarranted.

3. A physiologic salt solution of body temperature in conjunction with the tooth brush and precipitated calcium carbonate in the form of a powder or a paste (providing these preparations are in conformity with the claims as outlined above) is the safest and most efficient of all so far known, artificial, oral hygienic measures.

—*Herman Prinz, Journal Allied Dental Societies.*

The Plate was Recovered but—

A patient was received at the Waltham (Mass.) hospital, who had accidently swallowed a partial plate of three teeth. An X-ray examination showed the missing dentures located in the intestines. An operation was performed and the teeth removed but the patient died.—*Note and Comment, Oral Hygiene.*

A Convenient Styptic

To make enough alum wool to serve as a styptic to control the troublesome little hemorrhages of the gum, that are so apt to arise at the margins of a cavity in filling operations—and in this role it has no peer—one needs no other apparatus than a test tube of about six drachms capacity, and a spirit lamp. Half fill the test tube with distilled water, bring it to the boil, and then add powdered alum as long as it will dissolve. When the solution is quite saturated add absorbent wool until sufficient has been added to take up the whole of the solution. Then set aside to cool. When cold, remove the wool from the tube, lightly squeeze out the superfluous moisture and set to dry. This is conveniently done by laying it in a cardboard box (an empty compo box serves well), and placing in a warm place for a few hours, over the kitchen range for instance. When dry preserve in a wide-mouth bottle.

In the profuse hemorrhage which occasionally follows removal of the pulp, the canal should be wiped clear with cotton wool, and then, before it has time to fill again, some alum wool quickly introduced and pressed well up to the apex. The hemorrhage is arrested immediately and permanently. A tiny wisp of alum wool carefully tucked in between tooth and gum instantly stops bleeding from the latter in filling cervical cavities, and also in crowning operations.

For plugging sockets in post-extraction hemorrhages larger quantities of alum wool are needed, and these must, of course, be prepared in proportionately larger vessels. The handiness and cleanliness of alum wool in these cases, as compared with the use of powdered alum, have only to be experienced to be appreciated. Its styptic effect is quick and certain, because every strand of the wool is impregnated with alum, and forms a barrier against the egress of the blood. It is always ready for use, keeps indefinitely, and is clean and convenient to handle.—*J. T. Hall, L. D. S. I., in "British Dental Journal."*

Analgesia vs. Anesthesia

But analgesia is expensive, and, with due regard to its champions, is considered by the great body of the profession as dangerous, suited only to selected cases.

We have local anesthesia with novocaine and suprarenin. A great improvement over cocain, and with the nerve blocking system—intraneural and peri-neural, almost the equal of a general anesthetic, when it works.—*R. P. McGee, Oral Hygiene.*

Diagnosis of Hemophilia

For diagnosing hemophilia, Dubois recommends the following simple procedure: The lobe of the ear is pricked, and the drop of blood which will appear every 30 seconds is taken up with the blotting paper. In a normal condition of the blood the hemorrhage will cease after 10 to 12 blottings owing to the formation of a thormbus.—*Dental Cosmos.*

To Remove Glaze from Carborundum Stones

To renew carborundum stones that have become glazed from grinding down teeth containing amalgam fillings, place them in a beaker and cover with a five per cent. solution of nitric acid, allowing them to stand for two or three hours. Remove and place in a strong solution of sodium bicarbonate for several hours, that the acid which has been absorbed by the stones may be neutralized.—*Prinz, Dental Formulary.*

NEW PUBLICATIONS

The Internal Anatomy of the Face. By M. H. Cryer, D.D.S., Professor of Oral Surgery, University of Pennsylvania; Oral Surgeon to the Philadelphia General Hospital. Second Edition, Revised and Enlarged. Octavo 360 pages, with 377 engravings. Cloth, $4.50 net. Lea & Febiger, Publishers, Philadelphia and New York, 1916.

Dr. Cryer has given in his book the results of years of special study of the anatomy of the head and face. In pursuance of his research hundreds of sections of the facial region have been cut and examined. The lesson they teach is that the accepted descriptions are to be received as only general truths and that they cannot be depended upon or followed literally as a guide for the surgeon or dentist.

The results of these investigations afford a basis for the explanation of the failure of many dental and surgical operations conducted along the lines of accepted anatomical descriptions; such failures have been regarded as merely the natural percentage of unsuccessful treatment; whereas they probably have been due to variations in the parts clearly within the limits of normality. This is thoroughly demonstrated in the present work by text and illustrations.

No one who has carefully studied anatomy can fail to note the great number of variations which he meets. So common are these that it cannot be said with exactness what are typical and what are atypical conditions. Anatomy cannot be classed among the exact sciences. The more closely the subject is studied the more variations as to details are discovered. Especially is this true of the anatomy of the human head, as it is modified by climate, race, age, disease, occupation, and many other conditions.

In this edition the text has been thoroughly and carefully revised to meet the requirements of those making special studies upon, or operating in, the region of which it treats.

About 180 pages of new matter has been added including chapters on the teeth with their nerve and blood supply; on the distribution of the trigeminal nerve; the uses of frozen sections; and the inter-relations between the nasal cavity and its accessory sinuses and cells. Wide and narrow arches have been further considered, and a chapter on impacted teeth in which modern, ancient and prehistoric skulls and teeth have been compared and noted.

No dental library is complete without this book.

Essentials of Operative Dentistry. By W. Clyde Davis, M.D., D.D.S., Dean and Professor of Operative Dentistry and Technic, Lincoln Dental College, Lincoln, Nebraska. Second Revised Edition. St. Louis, Mo., C. V. Mosby Company Pub., 1916. Price net $4.00.

The author has prepared the work with the needs of the dental student in view. The text is arranged methodically and profusely illustrated with excellent engravings to the number of nearly two hundred.

The author states that it has been his aim to meet a demand in dental college work for a treatise on operative dentistry which is sufficiently condensed to enable the student to master its contents in the comparatively short college terms at his disposal.

Also, that an effort has been made to so publish the book that it would serve as a foundation for a quiz course as well as be suggestive to the teacher for a more full explanation, and, at the same time, encourage the student to extend his studies to more voluminous reference books for an explanation in greater detail.

The book is a concise, practical working guide to this very important subject.

Gould and Pyle's Cyclopedia of Practical Medicine and Surgery, with particular reference to diagnosis and treatment. Third enlarged and revised edition. By R. J. E. Scott, M.A., B.C.L., M.D., New York. Six hundred and fifty-three illustrations. Philadelphia; P. Blakiston's Sons & Co., 1916. Price, net, $12.00.

In this work are given the most important facts in all branches of medicine and surgery that are of working value to the active practitioner. At the same time, the authors say they have endeavored to provide a trustworthy handbook for easy and rapid reference in physical and clinical diagnosis, general therapeutics, operative technic, materia medica, toxicology and other subjects, concerning which information is constantly needed in undergraduate study and in daily practice.

Diagnosis and treatment have received particular attention—many minor subjects of genuine value to the practitioner, but usually held of too little importance for discussion in text-books, are given proper consideration.

Numerous well-tried and valuable formulas are distributed throughout the volume. Where possible the information has been presented in tabular form arranged in convenient parallel columns.

Although the subjects are generally introduced under the most common title, an attempt has been made to classify disease and injury according to the part involved.

Further to facilitate reference, frequent subdivision and a uniform system of bold-face headings have been used so that the subject-matter of a page may be seen at a glance. Throughout the book English generally has been preferred to Latin.

In this new edition several new sections have been added and such changes made as were necessary to bring the text into accord with recently established facts, and the number of cross references has been materially increased.

Profitable Practice. By George Wood Clapp, D.D.S., author of Brother Bill's Letters, The Mechanical Side of Anatomical Articulation, Prosthetic Articulation, etc. Editor of the Dental Digest. New York; Published by The Dentists' Supply Co., 1916.

This is a book considering the business side of dentistry and is filled with facts and suggestions helpful for every dentist.

The text is divided into three parts—Part One treats The Economic Conditions in Practice; The Economic Object of Practice; The Professional and Business Aspects of Practice; The Value and Cost of Dental Services; Office Hours; Income Hours; The Elements of Cost.

Part Two:—Costs and Receipts in Practice –Summarizing Costs and Receipts in Practice; Practices; Determining Operating Costs; Descriptions of 3,578 Operations and the Required Time; How Minimum Fees Are Computed.

Part Three:—Increasing the Profit in Practice; Bookkeeping; Selling Service; Assistants; Buying for Profits; Accumulating a Competency; A Possible College Course; Code of Ethics; Index.

It is a book that every dentist should buy and study.

Care of the Mouth and Teeth. A Primer of Oral Hygiene. By Joseph Herbert Kauffman, D.D.S., Attending Dental Surgeon to the Bronx Hospital Dispensary and Assistant Dental Clinician to the Vanderbilt Clinic, New York City. New York; Rebman Company, 141 W. 36th St., Pub. 1916. Price, net 60 cents.

The author states that this brief volume aims at nothing else than the grasping of the fundamental idea of the value of oral hygiene. And the author has told in a concise way how and why we should faithfully preserve the healthful condition of the mouth and teeth and so help to perfect ourselves physically, mentally, morally.

In the six chapters that comprise the text the following subjects are given consideration: Why We are Especially Interested in the Mouth and Teeth; The Relationship of the Oral Cavity to the Rest of the Body; The Structures and Functions of the Mouth and Teeth; Results of Neglecting the Cleanliness of the Oral Cavity; Measures of Oral Hygiene; Beneficial Results of Oral Hygiene; Index.

SOCIETY·ANNOUNCEMENTS

Ohio State Dental Society

The fifty-first annual meeting of the Ohio State Dental Society will be held in Dayton, December 5, 6, and 7, 1916.

A more complete announcement will appear in the November number of THE SUMMARY, but we can now announce a program of high practical and scientific interest with many instructive clinics.

Mark off the dates now and make your hotel reservations early.

F. R. CHAPMAN, *Secretary.*

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing November 20, and continuing six days. For application blanks and full particulars address Dr. Fred J. Prow, Secretary, Bloomington, Indiana.

Pennsylvania State Board

The next meeting of the Pennsylvania Board of Dental Examiners will be held in Musical Fund Hall, 808 Locust Street, Philadelphia, and at the University of Pittsburg, on Wednesday, Thursday, Friday and Saturday, December 6, 7, 8, and 9.

The practical work will be held on Wednesday, December 6, at the Philadelphia Dental College, 18th and Buttonwood Streets, Philadelphia, and University of Pittsburgh Dental Department, Pittsburgh. The operative work at 8:30 A. M., and the prosthetic at 1:30 P. M. It will be necessary for all applicants to take the examination in practical work, including those coming up for re-examination.

Blanks for the yearly registration of all dentists in Pennsylvania as required by the Act of 1915, will be mailed during October, and anyone not receiving the same, can secure them by addressing the Secretary of the Board of Dental Examiners.

Application blanks for the examination can be secured from the Department of Public Instruction, Harrisburg.

Further information, address the Secretary,

ALEXANDER H. REYNOLDS,
4630 Chester Ave., Philadelphia.

Ohio State Board

The October meeting of the Ohio State Dental Board will be held in Columbus. The practical examination will begin at 8:30 A. M., Monday the 23d, at Ohio State University Dental College, and the theoretical examination at 8:30 A. M., Thursday of the same week.

Ohio State Dental Board,
R. H. VOLLMAYER, *Secretary.*
Toledo, Ohio.

Magazines For Exchange

EDITOR THE DENTAL SUMMARY:

We have many duplicate volumes of the *Ohio Dental Journal* and the SUMMARY (135 bound and unbound volumes and many more odd numbers) which we would be pleased to exchange for items missing from our library shelves. Perchance you have inquiry for missing numbers, which you are unable to supply, we would be pleased to be placed in communication with the party making inquiry, if you would be so kind as to pass the same on to us.

We desire to get into touch with every one interested in making a Dental Library.

Yours very truly,
WM. BEBB.

Northwestern University Dental School,
Northwestern University Building,
Chicago, Illinois.

New Mexico State Dental Society

The ninth annual meeting of the New Mexico State Dental Society was held at Albuquerque, New Mexico, July 6, 7, and 8.

There was a good attendance and the meeting was the best in the history of the society. One of the principal topics was Oral Anatomy and Conductive Anesthesia. The clinics were various and of special interest to the profession.

The following officers were elected for the ensuing year: President, C. A. Eller, Albuquerque; first vice-president, R. H. Gudger, Silver City; second vice-president, C. H. Woolgar, Magdalena; secretary and treasurer, J. J. Clark, Artesia.

Indianapolis Dental Society Takes Important Action

At a meeting held on the evening of September 11th, The Indianapolis Dental Society became a member of the Indianapolis Better Business Bureau which is a part of the Vigilance Committee of the Associated Advertisers of the World.

This action was taken so that dentists might secure the help of these men in cleaning up all dental advertising of a fraudulent nature in Indiana.

Michigan State Board of Dental Examiners

The next regular meeting of the Michigan State Board of Dental Examiners for the examination of applicants who may desire to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, November 13, 1916, at 8:00 A. M., and will continue through Saturday, November 18. All applications and credentials together with fees, *must be in the hands* of the Secretary at least ten days prior to the date of examination.

For application blanks and all further information, application should be made to

E. O. GILLESPIE, *Secretary-Treasurer,*
Stephenson, Mich.

Northwestern (Ia.) District Dental Society

The Northwestern District of the Iowa State Dental Society will hold its annual Clinic and Manufacturers Exhibit November 8, 9 at Martin Hotel, Sioux City, Iowa.

C. E. WESTWOOD, *Secretary,*
Sioux City.

Ohio Dentists Take Notice

Ohio State Dental Society members and officers of components will please take notice that the dues for the ensuing year are increased by one dollar, making the dues now $4.00 per year.

The increase is in the amount paid per member to the National Dental Association and is for the purpose of establishing and furnishing each member a monthly National Dental Journal in 1917.

F. R. CHAPMAN, *Secretary,*
Ohio State Dental Society.

Rhode Island Dental Board

A regular meeting for the examination of candidates by the Rhode Island Board of Registration in Dentistry will take place at the State House in Providence, R. I., November 7, 8, 9, 1916. Only graduates holding a diploma from a recognized Medical or Dental College are admitted to this examination. Additional information may be obtained from the Secretary.

WILLIAM B. ROGERS, D.M.D.,
171 Westminister St.,
Providence, R. I.

American Institute of Dental Teachers

The next annual meeting of the American Institute of Dental Teachers will be held at Hotel Adelphi, Philadelphia, Pa., January 23, 24, 25, 1917.

A number of papers, reports and discussions relating especially to dental education will mark this meeting. All dental teachers are cordially invited to be present.

ABRAM HOFFMAN, *Secretary,*
529 Franklin St., Buffalo, N. Y.

OBITUARY

Norman Greene Reoch, D.M.

"The hand of the reaper
Takes the ears that are hoary,
But the voice of the weeper
Wails manhood in glory.

"The autumn winds rushing
Waft the leaves that are sorest,
But our flower was in flushing
When blighting was nearest."
—*Scott*

ON Thursday, May 25th, at 10 o'clock P. M., Doctor Norman Reoch died." Such was the message that shocked and grieved his friends on the following morning. Blessed with a rugged constitution and enjoying the best of health, the suddenness of his death remains a mournful mystery to his hosts of friends.

Doctor Norman Greene Reoch was born at Riverpoint, in the town of West Warwick, Rhode Island, on October 20, 1879. He was the second youngest of a family of five boys and three girls. His mother's name was Helen Stewert, and his father's name Robert Reoch. Both father and mother came from Burrhead, a large industrial town about seven miles west of the city of Glasgow, Scotland.

At five years of age Norman was sent to a private kindergarten school, where he remained for three years. In his eighth year he attended the Phoenix Grammar School, where he remained for three years. In 1890 in his eleventh year, he entered the English and Classical School in the city of Providence, spending three years in the Junior and four years in the Senior department. He graduated with high honors from this institution in 1897, in his eighteenth year. In the fall of this same year he entered Harvard Dental College, graduating in 1901. He was the youngest graduate in his class, being in his twenty-second year. After his graduation Doctor Walter Kenyon, of Providence, the family dentist, strongly urged his father to train him as a specialist. As a result he entered upon a course of Orthodontia under Doctor Angle in St. Louis. He remained in St. Louis for two years, the second year as Doctor Angle's assistant. He also spent some time in Chicago and Detroit at Doctor Angle's suggestion, to obtain some knowledge of office practice and routine. At length, in the fall of 1900, in his twenty-fourth year, he opened offices in Warren Chambers, Boston, where he remained till his death. Soon after starting to practice in Boston he became an assistant instructor in Harvard

Dental College, which position he retained for several years. Dr. Reoch was also until his death, consulting orthodontist at the Forsythe Institution for children.

From childhood Doctor Reoch was a lovable boy, a favorite with his playmates and school companions, generous and unselfish in the extreme, and these characteristics remained with him all through life. He was the possessor of a pleasing personality which gained him friends wherever he went. He was naturally shy and unobtrusive, and though possessed of talents much beyond the average, he shunned rather than sought notoriety, never cared to push himself forward or felt puffed up with pride on account of his attainments, and would invariably stand aside and give way to others, rather than attempt to stand in the way of their preferment.

Among other memoirs contributed by his father is the interesting fact that he had a natural gift for drawing, which was quite remarkable, and when only a boy entering his teens produced some landscape scenes in crayon work which were most creditable. The only lessons he ever received in drawing were obtained from the village barber, who also had a natural taste for drawing and painting, which was wholly self acquired. At the Kent County Agricultural Fair in Rhode Island, Norman in his thirteenth year took first prize in a drawing competition for children under sixteen years of age. In the following year at the Rhode Island State Fair he also took first prize. The picture he exhibited on this occasion was a pastel representing a woodland scene. These two pictures are framed and adorn the walls of his father's house today.

When about eight years of age Norman began the study of the violin, and soon developed a wonderful aptitude for that instrument. When he entered Harvard in 1897 he was very proficient on the violin, and displayed remarkable talent. While in college he became a member of the Pierian Sodality, the largest musical club of the college, playing first violin.

Norman was always fond of athletic sports of all kinds, and particularly fond of swimming. This led to a sad episode in his career while at Harvard. He and his roommate at college, Mr. Joseph W. Smith, of Andover, a young man of great promise, went off on a canoeing trip in Maine during their vacation in the summer of 1900. All went well until their return trip on the Bay of Naples, when a sudden squall struck them, and capsized the canoe with all their camp equipment, etc. The two young men at first strove to save all the floating wreckage, but squall after squall struck them, separating them far apart from the upturned canoe, and in this plight, Smith was seized with cramps and disappeared. Norman was rescued in an exhausted condition, but young Smith was drowned. It is interesting to note that Dr. Reoch thought this said experience would surely cure Norman of his extreme fondness for the water, this being his third rescue from drowning, and it was often remarked at home that in whatever way his death was destined to take place it was evidently not to be by drowning; yet after all, Norman's love of the water was without doubt the indirect cause of his untimely death.

On the afternoon of his death Doctor Reoch found recreation in cutting the lawn of his Winthrop home. The warm weather moved him to follow the strenuous exercise by a swim in the ocean. The cold water caused him to experience some discomfort, but to a man of his physique and excellent health this seemed of no consequence. He motored to the city, spent an hour in his office (completing several retaining appliances for children who were leaving for the summer), and left the building at eight o'clock in his usual happy mood and apparently in the best of health. Returning to his home he played with his little nephew and his pet dog, bade his wife good night, and retired. But before he could have passed into the refreshing sleep of night he passed into that sleep from which there is no awakening. His splendid physical condition saved him from death in the ocean, but death came to him in sleep, without warning to himself, to his family or to his friends. Could we who knew him, we who respected and loved him, we who knew his virtues and his accomplishments, we who have had the privilege of his friendship, experience a greater shock? Well do we remember his return to Boston, at a time when Orthodontia was not recognized as a specialty. He received no encouragement in his intention to specialize, but he "promised Doctor Angle that he would practice Orthodontia as a specialty," and he kept his promise. He became one of Boston's first Orthodontists. He had a large and lucrative practice—a practice of children who loved him, children whose appreciative parents believed in him and in his ability. He had the respect and confidence of his professional brethren. He was a member of many dental societies, among which are Massachusetts and National Dental Associations, Harvard Dental Alumni Association, Harvard Odontological, American Society of Orthodontists, etc. As a teacher he was a student with students, always courteous and ever willing to impart what he could of his unlimited knowledge of his favorite subject, and the student who could be in Doctor Reoch's class considered himself fortunate. He had a happy home and a loving wife, formerly Miss Helen Baker, whom he married October 6, 1915. He loved animals as he loved children; he loved nature, the woods, the hills, the streams, and he loved the ocean—and the ocean caused his death.

He was buried from his father's home in Phoenix, Rhode Island, on May 29th. He left behind him his family, his little patients and a host of friends to mourn; but the world is a better world because Norman Reoch lived.

M. D. Littig, D.M.D., M.D.,
F. A. Keyes, D.M.D.,
Boston, Mass.

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

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The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
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REGULAR CONTRIBUTIONS

THE PREVALENCE OF CHRONIC MOUTH INFECTIONS AND THEIR MANAGEMENT*

BY FREDERICK B. MOOREHEAD, M.D., CHICAGO.

AN EXAMINATION of the histories of 498 cases of chronic arthritis in the service of Dr. Frank Billings at the Presbyterian Hospital, Chicago, furnishes valuable information on the incidence of chronic mouth infections. Of this number 332 had careful Roentgen-ray mouth examinations; 1,132 periapical infections ranging from small areas of rarefaction to gross bone lesions were recorded; 994 of the teeth involved had been treated, with varying degrees of root-canal fillings, and 138 teeth showed no evidence of root-canal treatment. The percentage of patients in this

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*Chairman's address. Read before the Section on Stomatology, American Medical Association, of which the DENTAL SUMMARY is the representative organ for the dental profession, by special arrangement with the *Journal American Medical Association.*

group showing definite Roentgen-ray evidence of chronic alveolar abscess was 89; 1,342 teeth were involved in varying degrees of pyorrhea, the diagnosis being based largely on the Roentgen-ray evidence of peridental membrane destruction. Seventy-six per cent. of the patients showed well defined pyorrhea, many of them well advanced with marked suppuration.

A second group of patients from Dr. Billings' service, seventy in number, excluding all arthritics, showed chronic alveolar abscess in 74 per cent. The list included myositis, neuritis, goiter, asthma, nephritis, etc. Forty-nine per cent. had pyorrhea. A third group taken from 150 private office records showed chronic alveolar abscess in 69 per cent.

In determining the incidence of chronic alveolar abscess in patients suffering from chronic disease, one should limit his investigations to adults. Other foci of infection are more likely to be responsible for chronic disease in young people in whom the tonsil undoubtedly is more often responsible than the teeth.

While pulpless teeth are met with in young people, the percentage is quite low compared to those of middle life. This is more largely true of pyorrhea than chronic alveolar abscess. Pyorrhea before twenty-five years of age is comparatively rare. The danger both from chronic alveolar abscess and pyorrhea decreases with advancing age, and the loss of teeth. One may regard, therefore, the period from 25 to 60 as the period of greatest danger.

An edentulous jaw or partially edentulous jaw, where the remaining teeth are free from infection, does not absolve the mouth from responsibility. The removal of part or all of the teeth involved in a chronic infection may serve to clean up the mouth of a patient whose tissues elsewhere have suffered permanent harm, and without effecting a cure. The fact that a mouth at the time of examination may be free from infection does not exclude such a mouth from responsibility any more than the removal of infected teeth insures the repair of permanently damaged joints or other structures.

Such an argument, however, does not absolve one from the responsibility of removing infection whenever it is discovered, whether in recent or long standing cases. The 718 cases cited illustrate the incidence of chronic mouth infection in three groups of cases. The first group of 498 cases were all chronic arthritics. The second group of seventy were chronic infections, none of them suffering from joint lesions. The third group of 150 were office cases, referred for mouth examination because of some systemic disease.

In the first group 89 per cent. had alveolar abscess; the second group 74 per cent., the third group 69 per cent.

The appearance of 89 per cent. of chronic alveolar abscess in so large a group of hospital patients is probably more than presumptive clinical evidence, particularly when viewed in the light of results following treatment and animal experimentation.

In the light of our present knowledge these facts must constitute an eloquent predication. An interesting feature of our study of the frequency of chronic mouth infections was the discovery that the poorer classes had relatively fewer chronic abscesses than the middle and well-to-do classes. The reason is not difficult to find—the poor people, including foreigners, usually have aching teeth treated by early extraction.

Considering the manner of infection, chronic alveolar abscess may be classified as primary and secondary: primary, those in which infection occurs through the root canal from an infected pulp; from faulty technic in root-canal treatment; from a failure to adequately seal the root canal and pulp chamber in the introduction of permenent filling materials. Those infections classed as secondary are blood borne, the predisposing cause being a lowered resistance in the periapical tissue brought about, first, by the careless use of arsenic as a devitalizing agent, and, secondly, by the indiscriminate use of irritating agents in the treatment of root canals. The irritation set up in the tissues at the apex of the root results in a stimulation and multiplication of the fixed tissue cells, and the end result is scar tissue, which interferes with normal circulation. The resistance of such areas is relatively low. A periapical infection in a vital tooth can scarcely occur. These secondary infections may be largely represented by the principle of asepsis rather than antisepsis. More good and less harm is accomplished by surgical cleanliness than by the use of antiseptics and disinfectants.

The relative danger of chronic abscess compared to pyorrhea is difficult to measure. While a closed suppurating cavity is more serious than an open one, the quantity of infection is apt to be very much greater in pyorrhea.

Pyorrhea may be looked on as the lesser of two evils, but not to any degree of tolerance.

TREATMENT

The object of treatment is twofold: first to save the teeth, and second, to rid the mouth of infection. Whatever form of treatment may be undertaken, nothing short of restoring the tissues to a state of health can be considered satisfactory.

A discussion of the various methods employed in the treatment of pyorrhea would for the present purpose be without profit. No fault can be found with an honest, intelligent effort to save teeth involved in a chronic suppurative pericementitis.

In carefully selected cases in the mouths of patients who are in a state of good health, one may properly undertake the treatment of teeth which are not seriously damaged. Where a large portion of the peridental membrane has been destroyed, no permanent cure need be expected. The process of repair in this class consists in the formation of connective tissue—scar tissue—in which the circulation of blood is very limited and which does not form a biologic union between the cementum and alveolar process. No permanency need be expected of repair of this type.

The fibers of the peridental membrane are attached to the cementum by the cementoblasts. Destroyed by a chronic suppurative pericementitis, the cementoblasts probably do not regenerate to any appreciable extent. The cementoblasts being destroyed, there is no hope of union between the cementum and surrounding tissues, except by scar tissue. There is no continuity of tissue in this type of repair, and reinfection is likely to follow.

Well selected cases in the hands of specially trained men undoubtedly yield gratifying results; but the number of men thus qualified form a small percentage of the dental profession, and a great many people are afflicted with chronic suppurative pericementitis.

Recently emetin has been rather extensively advocated and used in the treatment of this condition on the assumption that the endameba was the essential cause. This has been based on a rather far-fetched analogy. No one to our knowledge has demonstrated by animal experiments or even convincing clinical evidence, that the endameba bears anything more than perhaps a symbiotic relationship to the infection. While we cannot at this time enter into a detailed discussion of the subject, we cannot refrain from expressing the opinion that the use of emetin as an experiment has been a failure.

The treatment of chronic alveolar abscess falls naturally into two groups: (1) conservative, and (2) radical.

The first type saves the tooth, and, theoretically at least, removes the infection. The second type removes the tooth and is the only method which removes infection in all cases. In the first type there is involved the opening of each root canal to its apical foramen, and complete disinfection and filling with a neutral substance which shall seal the canal at the foramen, and shall not be affected by moisture or cause irritation to the surrounding tissue. Theoretically these are the requirements. Practically they are realized in a minor degree.

Allowing for natural conditions and body defenses, probably not more than 25 per cent. of all root canals treated may be considered safe. This statement embraces general practice and does not particularize the few teeth treated by a few specialists.

At present there are not enough dentists to care for the people, and while the poor and ignorant have been automatically excluded in the past, they must now be dealt with, because of our new knowledge of chronic infection, on the same basis as the better classes.

Perhaps not over 10 per cent. of dentists may be considered competent to undertake difficult root-canal operations. Surely not over 10 per cent. of the people can afford to pay for the services of a dentist who has acquired high skill in root-canal technic. If, then, there are too few dentists to take care of all the people, and all the people must be cared for in the matter of infections, and only 10 per cent. of the dentists may be called on to save teeth involved in chronic infections, and only 10 per cent. can afford the services of a specialist, after discounting the successes of specialists in root-canal technic, one is confronted with the practical fact that most of the people are seriously involved.

One may postulate that only certain chronic infections are dangerous; but who shall discriminate and say, "This chronic abscess or pyorrhea is harmless and this one harmful"? When in doubt and the patient is ill, which shall be sacrificed, the tooth, or a possible opportunity for the patient's recovery? No doubt teeth are being extracted which do not bear a causal relationship to general infection; but it certainly is the lesser of two evils to remove the tooth. In so doing one is at least performing a reasonable service in an attempt to bring back health, and whether a patient is well or ill it is never justifiable to allow any infection to remain anywhere in the body which may be removed with as little loss or discomfort as the extraction of a tooth. The functional value of an infected tooth cannot compensate for the harm it may cause.

Every tooth should be saved which may be made to serve the patient better than an artificial substitute, provided we interpret the quality of service in the light of the health and comfort of the patient. Conservative dentistry is strongly urged when its objective is general physical well-being. Saving teeth which perpetuate chronic infection is not conservative dentistry, but destructive dentistry. The chief object of dentistry must always be the maintenance of health. The teeth must not be looked on as independent structures, but as interdependent structures. Viewed as tissues intimately associated with health and disease, the teeth and their adnexa cannot be dealt with in the abstract. One may undertake conservative measures in the mouths of patients who are in good health and whose general body defenses are good. Such cases, however, must be checked up and not dismissed until the teeth in question are either free from infection, or, in case of failure of treatment, have been removed. While at a given time a patient may be in a state of health, one may not presume on good health, and permit conditions to exist which he would not permit in the mouths of those in a state of ill health.

Because of general serious conditions one feels obliged to extract teeth which might be saved if the health of the patient would justify the necessary time for treatment. Teeth may always be extracted, and every reasonable effort should be made to save them when local conditions indicate that they may be saved, and the patient's interests are in no way jeopardized by the process.

While the Roentgen-ray is relative, not absolute, we are dependent on it for our estimate of tissue loss both in chronic suppurative pericementitis and chronic abscess. The interpretation of Roentgen-ray films is a fine art, but no amount of experience will save one from occasional surprises and disappointments. A large granuloma, for example, may involve only the spongiosum, and where the external and internal bony plates are thick and dense, the Roentgen-ray will not define the area.

To differentiate between an active infection and a rarefied area which has been disinfected and is undergoing repair is difficult or even impossible, especially in a dense field.

The relation of tooth roots to rarefied areas may quite obscure a lesion where the exposure has been made from only one angle. Even though unsatisfactory at times, the Roentgen-ray is an indispensable factor in the diagnosis of bone lesions associated with the teeth, and the percentage of failures or mistakes in diagnosis is relatively small.

The very fact that clinical experience demonstrates occasional positive and negative errors, only serves to make one careful not to overlook the danger of doubtful cases. The apparent size of a diseased area bears no relation whatever to its possible danger. Chronic infections are dangerous because of quality, not quantity. When conservative treatment is undertaken, the Roentgen-ray should be used, first to demonstrate successful root-canal fillings, and second, to check up on the process of repair. Partially healed foci must be looked on with suspicion. Residual infection, though limited in extent, following either therapeutic or surgical measures, may be quite as dangerous as before treatment. No dependence whatever may be placed on subjective symptoms. Through active therapeutic measures a chronic alveolar abscess with a discharging sinus may quiet down, the sinus close, and the overlying tissue become normal. From clinical evidence alone such cases have been classed as cured. In the absence of a roentgenogram no definition of repair can be made. Frequently these cases do not heal, and are much more serious than before treatment, the treatment rarely serving to convert an open infection into a closed one.

SUMMARY

1. The incidence of chronic mouth lesions in a group of over 700 carefully analyzed cases, showing percentages ranging from 69 to 89 per cent., must be looked on as more or less serious evidence.

2. The overwhelming majority of chronic abscesses being associated with previously treated root canals serves to emphasize the importance of root-canal technic.

3. Both in diagnosis and in determining the extent of tissues lost, the Roentgen-ray is paramount.

4. The involvement of the peridental membrane is the crux in deciding between conservative and radical treatment.

5. Faulty root-canal technic, the careless use of arsenic as a devitalizing agent, and irritating drugs in the treatment of root canals are strong predisposing factors of chronic alveolar abscess.

6. In carefully selected cases, conservative measures should be employed both in the treatment of chronic abscess and chronic suppurative pericementitis.

7. Where root canals have been disinfected and filled, portions of roots resected, etc., the process of repair should be checked up by roentgenograms made at frequent intervals.

8. Regardless of whatever form of treatment may be employed, the removal of infection is imperative in all cases, whether the patient at the time may be well or ill.

Where the health, comfort and usefulness of a patient are to be weighed over against a tooth, or even all the teeth, the greater interests of the patient must be preserved.

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THE PRINCIPLES INVOLVED IN FOCAL INFECTION AS RELATED TO SYSTEMIC DISEASE*

BY FRANK BILLINGS, M.D., CHICAGO.

WE UNDERSTAND that an infectious disease is a condition due to the invasion of pathogenic micro-organisms, which are capable of multiplication within the tissues of the host.

The principles of infection, both local and general, may be discussed by a consideration of three chief factors:

1. The pathogenic micro-organisms and the conditions which modify their virulence and pathogenicity.

2. The host or infected individual and the conditions which modify his susceptibility to infection.

3. The nature and result of the reactions between the infectious agents and the tissues of the host.

THE PATHOGENIC MICRO-ORGANISMS

The pathogenic micro-organisms which may cause infectious diseases are certain fungi, unicellular animal life, the protozoa, and bacteria. We also recognize that certain infectious diseases are caused by a filterable virus of ultramicroscopic size. The subject of this paper will be limited to a discussion of infectious bacteria, with the exception that *Endameba buccalis* will be considered in oral sepsis.

The objects of the paper will be quite as fully attained, too, by limiting the discussion to the usual pathogenic bacteria which cause focal infection, namely, the members of the streptococcus-pneumococcus group, staphylococci, gonococci, colon, diphtheria and tubercle bacilli, certain anærobes and possibly other micro-organisms. Practically all of these may be found on the skin or mucous membranes, and if the surface is unbroken they may exist as harmless parasites. Apparently healthy individuals may be carriers of the bacilli of influenza and diphtheria and of streptococci, pneumococci and meningococci located on the mucous membrane of the tonsils, pharynx, nose and accessory sinuses. An individual who has had typhoid fever and occasionally one who has never had the disease may be a carrier of typhoid bacilli which may be discharged with the feces and urine. The bacteria named may bear an apparently harmless parasitic relation to the carrier, but if communicated to another individual may excite morbid reactions within the tissues of the new host.

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*Read before the Section on Stomatology, American Medical Association, of which The Dental Summary is the representative organ for the dental profession, by special arrangement with the *Journal American Medical Association.*

The perpetuation of micro-organisms requires that they be transmitted from time to time to new hosts. That is accomplished by a direct route through the secretions and excretions of the mucous surfaces on which they live as parasites; through the pathologic products which they excite in infected tissues, and indirectly through the blood stream by way of the secretions and excretions. Here we are not concerned with those infectious diseases transmitted by blood-sucking insects. In direct transmission to new hosts the pathologic exudates must communicate with the outside surface, as in furunculosis, tonsilitis, sinusitis, gonorrhea, pyorrhea alveolaris, and bronchitis.

The transmission may be facilitated by direct individual contact, as in kissing and coitus; through approximate contact by inhaling air immediately charged with infected dust, droplets of saliva and sputum; by contact with infected articles, drinking and eating utensils, dental and surgical instruments, clothing, and many other forms of fomites; through infected food, especially milk, and by many other means. The tissues of the new host may be infected, therefore, through the mouth, air passages, skin or genito-urinary apparatus. The infection may be single, as, for example, in gonorrhea, or mixed, as may be seen frequently in diphtheria, with coincident streptococcus infection of the throat. A secondary infection is the invasion of pathogenic bacteria into the tissues previously infected. It is a type of mixed infection. Clinical experience and animal inoculation seem to show that bacterial association in mixed infection tends to increase the virulence of one or all of the species included in the microbic invasion. For example, appendicitis, which in most instances is caused primarily by the hematogenous invasion of bacteria, may become fulminating and rapidly gangrenous through a secondary invasion of the injured tissues by the bacterial flora in the lumen of the appendix, usually colon bacilli and certain anærobes.

A high degree of virulence of the infectious micro-organisms is liable to destroy the host, and thus directly diminishes the chances of the infectious agents to pass to new hosts. While the susceptibility of the host to a specific infection is an important factor in the result of the microbic invasion, still the laws which govern the perpetuation of pathogenic micro-organisms include adaptation to the conditions, which mean lessened pathogenicity and permit of parasite existence. The permanency of the perpetuation of a given species will depend on the perfection of its adaption to the environment and the opportunity to pass to other hosts. As susceptible hosts diminish, through increased resistance, the infection becomes milder and mortality less. While the perpetuation of the existence of pathogenic micro-organisms is dependent on the attainment of a condition of parasitism and the opportunity to pass to the new hosts, there is proof that the infectious agents may regain pathogenic powers of a general and even of a special kind. The acquisition of a general or special pathogenicity with varying degrees of virulence may occur in various ways. Some of the species of bacteria under discussion are pathogenic for animals and may exist in the tissues of animals, as in man, as parasites. The bacteria existing as parasites in the animal may be pathogenic in the new host, man.

So too, the mildly pathogenic or parasitic species may be communicated by man to a medium outside of the body, on which the bacteria may grow and attain pathogenic qualities and varying degrees of virulence for the host. Dairymen may infect milk with streptococci from their mouths and air passages. Milk is a good culture medium and in it streptococci and other bacteria may attain unusual virulence, and cause severe infection of the mucous membrane of the throat and digestive tract of susceptible persons who drink the unsterilized milk. The micro-organisms which have become parasitic in one human host may become pathogenic when communicated to a new host more susceptible to the species. The bacterial invaders, mildly pathogenic, may become virulent in a host suffering with general debility from any cause, or whose vitality is low or in whom the blood circulation is poor because of exposure to extreme cold or to severe fatigue. The conditions mentioned and other modifying influences may, among other things, affect the oxygen supply of the tissues of the host. The varying quantity of available oxygen in the tissues may be an important factor in determining the immediate or remote development of the micro-organisms in the tissues into harmless parasites or into virulent invaders of local or systemic tissues.

Schottmuller classified streptococci pathogenic for man, by growing them in solid blood-agar medium, into *S. hemolysans (longus)*, *S. mucosus* and *S. viridans (mitior)*. We have learned that any one of these types may change in general and special pathogenicity and the degree of virulence. *S. viridans*, so named because of the green colored halo produced by the colonies on blood-agar, is usually of very mild pathogenicity for man. It is a very common surface parasite of the mucous membrane of the mouth and tonsil. Apparently this type of streptococcus may acquire special pathogenicity for the endocardium and especially for old valvular scars and cause enormous vegetations and thrombus formation on the heart valves. A person so affected suffers from a constant viridans streptococcemia. In other instances a green producing streptococcus of less virulence than the foregoing may be isolated from the infected tissues of the patients suffering from myositis, arthritis and other chronic diseases. Evidently the property of green color production on the blood-agar plates only affords a name, but does not signify the pathogenic character or virulence. The type may even lose the property of green color production on culture media.

By varying the character of the culture mediums, *S. hemolysans* may lose the property to hemolyze blood-agar medium. It may possess a hemolyzing property, and at the same time may vary in pathogenic characters. It may be pyogenic; may acquire a special pathogenicity and tropism for subcutaneous tissues, as in erysipelas without suppuration. The ability to hemolyze blood-agar does not necessarily indicate a special or general pathogenicity.

The variation of the members of the streptococcus-pneumococcus group in culture characteristics, biologic quality, in general and special pathogenicity and degree of virulence has been noted by many clinical bacteriologists. We know that these variations may be brought about in the laboratory, by serial animal inoculations and by modifications of the character of the media and the oxygen pressure in bacterial cultures.

Apparently like changes may occur in localized, confined infections, especially those due to the streptococcus-pneumococcus group. Here one may infer that the tissues involved in the focal infection act as a culture medium. The tissue mediums may be modified by variations in blood supply, consequently in oxygen tension, or unknown biochemic or other factors may alter the character of the confined infectious agents. Apparently in no other way may we explain the sudden onset of rheumatism after acute or during chronic tonsilitis; of streptococcus viridans endocarditis associated with alveolar abscess, and many other systemic infections, undoubtedly etiologically related to an existing chronic, localized and confined infection

THE HOST AND THE CONDITIONS WHICH MODIFY HIS SUSCEPTIBILITY TO INFECTION

Man possesses a natural immunity to infection, but it is never absolute. The facility of infection of the person and the opportunity for the pathogenic micro-organisms to perpetuate themselves, depends in some degree on the characteristics of the infectious agents, as we have seen, but also on conditions peculiar to the host.

The age, environment, social condition, occupation, habits, domiciliary and occupational environment, climate, physical well-being are important factors in determining the susceptibility of the host to infection. It is not necessary to consider all of these factors, but a detailed discussion of some of them is important in the attempt to establish a clear idea of the principles involved.

The individual host must be considered first, because he becomes a carrier of infection the more readily in proportion to the lack of personal cleanliness, in the habitual overuse of alcohol and habit-forming drugs, the practice of sexual immorality and other debility-producing habits. By contact with his fellow men in dwelling, workshop, and public conveyances and public congregations, he readily communicates the infectious parasites of which he is a carrier to others. The new hosts are more or less susceptible, dependent on the conditions which make for good or for bad defense, already mentioned. The facility of communication of the infection from host to host will be necessarily modified by the density of the population, by the hygienic conditions of the home, the workshop, the vehicles of transit, by the general conditions dependent on municipal control of the cleanliness of the streets, the water and the food supply and on the adequacy of the sewage disposal.

The person is also important as a host, in regard to the susceptibility to infection due to the modifying influence of age, occupation and the existing physical and mental conditions. The child is comparatively more susceptible to the contagious diseases. The lymphoid tissues of the child are relatively excessive, especially in the structures of the nose and pharynx. Therefore children suffer frequently with tonsilitis, coryza, sinusitis, otitis media and mastoiditis, both acute and chronic. The regional cervical lymph nodes may be secondarily infected from the foci named, and while the lymphadenitis may prevent immediate general infection, the infected glands may serve, sooner or later, as additional sources of systemic infection. The debility of old age, with the associated poor blood circulation, relatively low tissue nutrition and faulty metabolism, increases the susceptibility to infection and facilitates parasitism. Diseases due to faulty metabolism, like diabetes mellitus and gout, invite and prolong infection.

Exhausting chronic infectious diseases, like pulmonary tuberculosis, are frequently associated with secondary infection of pyogenic bacteria. The mixed infection promotes the virulence of one or all of the invading pathogenic micro-organisms with consequent harm to the host. Occupations which entail exposure to excessive fatigue, extremes of heat and cold and to air contaminated with mechanical and chemical irritants are important factors in the production of local and general infection.

THE NATURE AND RESULT OF THE REACTIONS BETWEEN THE INFECTIOUS MICRO-ORGANISMS AND THE TISSUES OF THE HOST

The entrance of pathogenic micro-organisms into the body of a susceptible host is characterized by local or general reaction between the invading parasites and the tissues of the host. Dependent on the virulence and genus of the invaders, the reaction in the tissues may result in exudates which may be serous, fibrinous, purulent diphtheritic, hemorrhagic, necrotic or proliferative. Local fibrinous and purulent exudates are apparent efforts of the tissues of the host to concentrate protective substances and physical barriers about the invading parasites to prevent extension of further infection. The walled-off infection may remain localized, the infectious parasites, adjusting themselves to a parasitic existence or local infection, may disappear under the influences of the defensive and offensive powers of the tissues, aided by medicinal or surgical management. On the other hand, the local infection may be coincident with general systemic infection or general infection may occur at some indefinite time subsequent to the local tissue invasion.

Systemic invasion from a local infection may be by way of the blood or lymph stream. The hematogenous route is undoubtedly the usual one. Practically always the regional lymph nodes are secondarily invaded from the primary local tissue infection. The lymph node infection may be subsequently a source of systemic infection by the hematogenous route. On the other hand the secondarily infected lymph nodes may be the place of destruction of the invaders.

The reactions of the systemic tissues hematogenously infected are essentially the same as those mentioned under the local reactions of the tissues; that is the production of serous, fibrinous, purulent, hemorrhagic or other inflammatory conditions. As already pointed out, these reactions are in the nature of defensive or offensive measures on the part of the tissues of the host to destroy the invading bacteria. The infectious micro-organisms also promote the formation within the tissues of the host of defensive and offensive substances, or antibodies. These substances in the form of ferments, are apparently mobilized by the reaction between the invading bacteria and the tissues of the host. Immunologists are not in agreement as to the exact factors which enter into the reaction. All are in agreement, that all pathogenic bacteria do not cause the mobilization of a uniform number or of like kind of antibodies. The number and kind of antibodies found in the host in some infectious diseases, like typhoid fever, may overcome the invaders and afford a lifelong immunity to future infection. In other infectious diseases the defensive and offensive forces may overcome the present invasion, but afford no protection, or apparently may increase the susceptibility to future attacks, as in pneumonia and rheumatism.

The result of hematogenous invasion with pathogenic bacteria will be modified by the specific type, the virulence of the bacteria and also by the character of the anatomic structure and specific function of the tissue involved.

The type and virulence will decide the character of the tissue reaction as to the formation of a serous, fibrinous, purulent or other form of exudate. The more virulent the invaders the severer the reaction. The less virulent type will cause serofibrinous exudates. The tissues of the host are disturbed by the reactions, destructive in character (abscess, necrosis, hemorrhage and gangrene) by virulent micro-organisms, and deprived of nutrition and oxygen, more or less, by the proliferation of the endothelium of the arterioles and the serous and fibrinous exudates by the less virulent invaders. The infection of a joint with virulent streptococci or virulent gonococci will cause purulent destructive arthritis. The infection with less virulent streptococci and gonococci will result, usually, in a chronic serous or fibrinous arthritis, with subsequent metabolic degenerative changes due apparently to the poor local nutrition, in consequence of the injury to the blood vessels and tissues of the joint. Very virulent bacteria are apt to cause local tissue destruction or to kill the host. That is, virulent bacteria may be ultimately destroyed by the severe reactions they excite in the tissues of the host.

On the other hand, pathogenic micro-organisms of low virulence, which gain access through the blood stream, excite mild reactions, which, however, lessen the supply of blood and oxygen to the tissues involved. This may create a condition favorable to the perpetuation of the invading bacteria in the tissues of the host. In this tissue medium the bacteria may continue to be pathogenic for an indefinite time or may become purely parasitic without apparent harm to the host. Chronic confined infection or even chronic general infection finds an explanation in the reactions excited in the tissues of the host by pathogenic bacteria of relatively low virulence. The natural anatomic structures of the teeth, dental alveoli, faucial tonsils, accessory nasal sinuses, seminal vesicles, prostate gland, fallopian tubes, gallbladder and other structures favor confined infection. When infected, the resulting morbid anatomic changes in all the tissues named add to the physical conditions which promote focal infection. This is well illustrated in chronic alveolar abscess. The invasion of the dental alveoli with *Endameba buccalis*, streptococci and other micro-organisms results in destruction of the peridental membrane and other tissues. The roots of the teeth deprived of periosteum become more or less devitalized and, with other local dead tissues, promote continued and aggravated confined infection. The structure of the faucial tonsils invites and promotes continued infection. An infected accessory nasal sinus does not as readily discharge the pathologic products of inflammation as the normal mucous secretion. The seminal vesicles infected with gonococci may retain them for years of time.

The function of infected specialized tissue will be usually disturbed in ratio to the degree of anatomic injury due to the invading bacteria. Hematogenous infection of the kidney may result in a general glomerulonephritis of a degree of severity entirely to suppress its function; a like infection of less severity may diminish the function, as manifested by the excretion of a scant, bloody albuminous and cast-containing urine. Periodic hematogenous infection of specialized tissues with bacteria of relatively low resistance results in repeated anatomic injury. The repeated injury to the blood vessels and other tissues may be so great finally as to result in malnutrition, and metabolic changes degenerative in character take place. Probably this is the sequence of events in chronic infectious nephritis, arthritis, myositis, pancreatitis and chronic infections of other organs.

The space allotted to this paper will not permit a discussion of the interesting tissue reactions, morbid anatomic changes and altered function which occur in infection of the stomach, subcutaneous tissues, the nerve ganglia, iris, thyroid gland and other specialized tissues.

CONCLUSIONS

The conclusions which may be drawn from this discussion of the principles involved in local and general infection are evident. The laws which govern the perpetuation of pathogenic micro-organisms involve a life of parasitism harmless to the host or of varying degrees of pathogenicity. Apparently any specific type of the bacteria discussed may attain the biochemic qualities which permit them to exist in the host as harmless parasites or as injurious agents possessed of a special or a general pathogenicity of varying virulence. The varying pathogenic qualities, special and general, may be acquired apparently in the host or in the passage from host to host (man or animal), or may be brought about in culture mediums.

Confined infection (focal) seems to be a site in which the infectious agents may attain specific pathogenicity chiefly in the nature of tissue tropism (elective tissue affinity). This special quality is not recognized necessarily by cultural characteristics. The power to hemolyze or to produce green color in blood-agar plates by some members of the streptococcus group does not necessarily indicate specific pathogenicity or degree of virulence. The special or general pathogenicity of the infectious agents of the focal infection, and the susceptibility of the host, measured by many factors cited in the paper, may determine the severity, acute or chronic, the extent, local or general, and the site, election of tissue, of the systemic infection. It is believed that these conclusions have been sustained by clinical observations and bacteriologic research.

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DENTAL INFECTIONS AND SYSTEMIC DISEASE—TREATMENT AND RESULTS*

BY ERNEST E. IRONS, M.D., CHICAGO.

FROM THE MEDICAL standpoint as well as from the dental, the object of the treatment of infections of the teeth is the conservation, as far as possible, of the structure and the function of the teeth, and the prevention of disabling systemic disease. So far as the physician is concerned the present discussion is in no sense a propaganda to prove anything with respect to the methods of treatment of teeth by the dental profession. It is rather a recital of facts which have come to light in the course of an effort on the part of the physician to understand the cause and mechanism of production of a large group of more or less disabling ailments which for years have baffled him in his efforts to cure them. It is true that there have developed many other angles to the question, but these latter have been largely secondary, and the main problem has been and is now that of relieving patients from their disabilities by as conservative and yet as effective method as possible. Every new proposal or discovery in medicine, or in any field of human activity, passes through certain phases of reaction on the part of the professions concerned, characterized by incredulity, popularity, abuse, and finally, if found of value, takes its place among recognized procedures.

This has never been better illustrated than in the present discussion of alveolar abscess and its relation to systemic disease. It would appear that the great prevalence of alveolar abscess was until recent years as little suspected by many of the dental profession as by physicians, although the importance of oral sepsis was pointed out years ago by such pioneers as Miller and Hunter. Now that the facts are becoming known, in large part by reason of the perfecting of roentgenographic technic, many readjustments

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*Read before the Section on Stomatology, American Medical Association, of which THE DENTAL SUMMARY is the representative organ for the dental profession, by special arrangement with the *Journal American Medical Association.*

of practice, both dental and medical, are being found necessary. It is the difficulties of these readjustments and not the fault of the demonstration of abscesses, which have led to certain temporary misunderstandings, for the correction of which the only essential is a frank discussion, and then sympathetic team-work between dental surgeon and physician.

In this discussion of the medical aspects of dental infection I shall limit myself more particularly to forms of disease associated with alveolar abscess. The more superficial lesions, such as pyorrhea and gingivitis, probably exert an unfavorable influence on the general health, and conversely, systemic disturbances may furnish the conditions favorable to their development; but as a rule they do not appear to give rise to the metastatic lesions so commonly associated with alveolar abscess. Extensive pyorrhea may result in lateral alveolar abscesses, and possibly give rise to distant metastases, but a study of the medical complications associated with dental disease leads one to the view that infections about the teeth conform to the same principles as do surgical lesions elsewhere, and that it is the closed process which usually gives rise to general infection.

I suppose every dentist will agree that a definite and recognized alveolar abscess should be eradicated, whether it is causing general disease or not. Such a position is in keeping with the best tenets of American dentistry.

It must be recognized also that the final decision as to diagnosis and proposed treatment of a dental lesion should properly lie with the dental surgeon, to whose opinion the physician should defer; but in order that his opinion may be worth having, the dental surgeon must acquire an adequate knowledge of the pathology as well as the mechanical treatment of the dental structures. The sins of omission in this matter have not been confined to the dental profession, however, for physicians have been notoriously remiss in the examination of patients, and have overlooked many sources of disease, including those of the mouth, which now are clearly evident.

The observance of ordinary rules of professional courtesy by the physician, the dentist, and, I might add, the roentgenographer will go far toward making successful team-work possible, but each must make himself professionally worthy to deserve this courtesy, and must be willing to listen to the views of his colleagues.

Before passing to a consideration of the results of treatment from a medical standpoint, I wish to refer to certain misconceptions which have been introduced into the problem.

The startling frequency of alveolar abscess and other extensive dental infection has so impressed many physicians and not a few dentists that they are ready to ascribe all human ailments to disease of the teeth, and to attempt to cure them all by the extraction of teeth without definite proof of incurable dental disease, or even presumptive evidence of the causal relation of the dental infection to the systemic disease.

This extreme and wholly unwarranted position has brought about a reaction, and in some quarters the pendulum has oscillated to the other extreme, at which are found a group of protesters, who are ready to declare that diseases of the teeth have no relation to infections in other parts of the body, and who from their attitude would seem to assume that the presence or absence of alveolar suppurations is a matter of no concern either to dentist or physician. Now looking at the problem for the moment from an impersonal point of view, one can see that neither of these positions can be right, but that the truth lies somewhere between.

Another group of physicians and dentists, enthusiastic, somewhat less radical than those just mentioned, have assumed that in a patient suffering from evident disease, such as arthritis, in whom also an alveolar abscess is found, there is necessarily a direct etiologic relation between the two, and that drainage of the abscess will surely result in cure of the arthritis. It is true that occasionally this is the sequence of events, but it often happens that the alveolar abscess is only one of several areas of chronic infection in the body, and may indeed be coordinate with arthritis, both being secondary to some previously existing infection. The perspective of the enthusiast in any specialty is likely to be narrow, and he does not appreciate the importance of the field of his colleagues.

Examination of the blood to determine the presence of leukocytosis has been proposed as a guide to the dentist in determining whether or not a tooth showing doubtful roentgenographic findings should be extracted. The desire of dentists to study patients more thoroughly is laudable, but in this instance the presence or absence of leukocytosis can be of but little value unless all other causes of leukocytosis, such as infections in tonsils, sinuses, the genito-urinary and other organs of the body are first excluded, and since this necessitates a complete medical examination, which is not usually available, the test must therefore be far less reliable in routine dental work than the expert examination of the patient's mouth and roentgenogram by the dentist.

The importance of alveolar abscess as a factor in the production of systemic disease has been already discussed by my predecessors in this symposium. Statistics on this subject have come largely from those who are interested in special lines of inquiry, and the relation of alveolar abscess to systemic disease has been determined by the study of groups of patients selected on account of the presence of some clinically striking lesion, such as arthritis.

An examination of the converse proposition is of some interest from the point of view both of etiology and of treatment. An unselected group of 329 patients in a medical ward in Cook County Hospital was studied and the incidence of all discoverable infectious processes determined and tabulated for each patient. The patients were then classified according to final diagnosis, and the percentage of each type of infection in each disease group calculated. It was possible to obtain roentgenographic studies, most of which were confirmed by consultation with dental surgeons, in 124 of the 329 patients. Careful tabulation showed that the patients submitted to roentgenographic examination were fairly representative of the entire group. In 44 per cent. of the 124 patients alveolar abscesses were found. In the arthritic group 76 per cent. had alveolar abscesses; in the group of nephritis and cardiovascular disease 47 per cent.; other diseases, including pneumonias, respiratory, gastro-intestinal, 23 per cent., or less than one third of the percentage in the arthritic group. Abnormalities in tonsils, as expressed by hypertrophy, were present in 45 per cent. of the arthritic group, in 24 per cent. of the cardiovascular group, and in 19 per cent. of the remainder. Other chronic infections, such as those of sinuses or genito-urinary tract, were found in 21 per cent. of the arthritic, 13 per cent. cardiovascular group, and 11 per cent. of other diseases. Syphilis, either from the history, clinical evidence or Wassermann, was found in 23 per cent. of the arthritic group, 39 per cent. of the cardiovascular group, and 13 per cent. of other diseases.

This group of patients is not entirely comparable to a group coming from a higher economic station in life, but the figures serve to demonstrate the relation of the incidence of infections to other forms of disease within the group.

All arthritis or other metastatic and systemic disease is not due to alveolar abscess or to tonsillar infection, of course, but the preponderance of such lesions in this group suggests that these infections may play an important part in the production of chronic arthritis and similar ailments, and probably of certain types of cardiovascular disease, not only the valvular, but the arteriosclerotic, and also certain forms of nephritis, in which cold and exposure are only part of the determining causes.

In the arthritic group therapeutic measures directed to the removal of infectious processes have been followed by gratifying results, even in a rather unfavorable material. Our readmissions for recurrences of arthritis, which in former years were frequent, some patients returning as many as four times in a season, have been relatively fewer, and usually of patients who for some reason or other could not be submitted to proper surgical attention.

In a series of 100 cases of iritis studied with Dr. G. V. J. Brown we found alveolar abscesses and other closed infections, as revealed by roentgenograms and expert dental consultation, in 36 per cent. of forty-seven private patients and 45 per cent. of fifty-three dispensary patients, and in 18 per cent. of the 100 patients the disease of the eye appeared to be associated with dental infection.

In estimating the results which may be expected from the correction of alveolar abscess in any given case it is evident that the presence and influence of other infectious foci must be considered, and neither too great credit for success nor too great censure for failure should be imposed on the dental surgeon who deals with only one of the possible factors in the larger general problem of recovery of the patient. Nor can we always promise prompt cure, even in those patients whose illness clearly originated in dental infection, for after the apparent immediate source of infection is removed, there often remain the mechanical injuries of joints and eyes, or other tissues may have become secondary foci of infection, and recovery is a question of measures which shall build up the resistance of the patient by improving his general nutrition.

VACCINES

The question of the use of vaccines has vexed the physician quite as much as it has the dentist. Active immunization by the injection of specific vaccines has proved of enormous value in the prevention of certain diseases, such as typhoid fever, but the results of the use of vaccines in the treatment of persons already suffering from infections have been in general decidedly disappointing.

There are certain more or less theoretical considerations in regard to the effect of an injection of vaccine on the balance of immunity between invading organism and host in a lesion such as alveolar abscess, but inasmuch as this balance may be deflected as often against as in favor of the host, the theoretical as well as the practical results of vaccine injections as now practiced indicate that their value is extremely doubtful, and that in no case should their use be allowed to replace or hinder the employment of recognized dental and surgical procedures.

Under the most favorable conditions a vaccine could be only an adjunct to other treatment, and in the types of disease we are now discussing, adequate surgical treatment by the dentist usually renders this adjunct superfluous so far as concerns the medical care of the patient. The dentist deals with special types of tissue, but allowing for peculiarities in structure and function of the tissues involved, the same principles of immunity and surgical procedure apply to infections about the teeth as to other organs of the body. When proper surgical measures are carried out by the dentist, the natural resistance of the tissues of the body, including those about the teeth, is usually sufficient to overcome the infecting organism. It would be foolish and futile to attempt to substitute the injection of vaccines for drainage and other well-established methods of treatment of an alveolar abscess; when proper dental procedures have been carried out, vaccines become unnecessary. The same statement would appear to apply to the treatment of pyorrhea, in which the practice of injecting vaccines, as advised by those commercially interested in their production and sale, has led to absurdities as discreditable to the skill of the dental profession as are similar practices so common in the past among physicians.

SUMMARY

The attitude of the physician in studying his patient should not be that of the prosecuting attorney bent on convicting the teeth of being the cause of all disease, nor should the dentist assume the brief of the defendant, ignoring the evidence of roentgenograms and systemic disease. Both must work in harmony, each believing in the sincerity and good-will of the other, observing professional courtesy and laboring to place the patient in the best physical condition possible.

There seems to be no question that in many cases alveolar abscesses are the sources from which invading organisms pass into the circulating blood and produce lesions in joints, eyes, nerves and other structures of the body. It is also true that alveolar abscesses, like tonsillar and other infections, may be latent so far as any marked effect on general health is concerned. Nevertheless, they are potential sources of trouble, and from the medical standpoint, and, I believe from the dental, should be eliminated. The recognition of the important relation of alveolar abscess to systemic disease is a great step forward, and the period of extreme neglect of the past will never return. The readjustments in methods of diagnosis and in the establishment of a rational conservatism will come gradually as we learn to appreciate the interdependence of all organs of the body and the community of interest of the dental and medical professions. And this advance in turn calls for better medical education, better dental education.

The difficulties and misunderstandings from which we are now emerging afford one instance among many of the necessity of providing educational facilities which shall produce broad-minded professional men who can appreciate the problems of departments of human medicine other than their own.

DISCUSSION

ON PAPERS OF DRS. MOOREHEAD, BILLINGS AND IRONS

Dr. Robert Hessler, Logansport, Ind.: When I first entered the medical college in 1889 my respiratory mucous membranes reacted acutely; I had profuse coryza and catarrh. At times the secretion was abnormal, and under severe infection there was actual pus. After the formation of scar tissue the mucous membranes reacted less. At present I seldom have a coryza. I have an "open throat"; it is not closed by encroaching hypertrophied tonsils. In the course of years the reaction of the respiratory tract on inhaling infected air became less marked, but the cardiovascular system reacted. Ordinarily, I live under good air conditions on the edge of a small town and my blood pressure is about 100. On inhaling infected dust, as at present, it will run up to 150. My father was a "high pressure case" and died at 40; I am 55. During the last year I noticed a new reaction: After being exposed to bad air, I could readily draw blood from my gums; in the morning it is dark. I can do it now; I tried it a few moments ago. Depending on the amount of infection inhaled or length of exposure, this condition prevails for one or more days, maybe a week, when it fades. Then there may be another exposure, and I can again draw blood. The gums are infected. At such times I also notice more or less arthritic pain, especially in the wrists. It means infection. (My father was subject to general arthritic, "gouty" pains and had an ankylosed left wrist.) As a student of prevalent ill health and causes, I believe the problem is largely one of communal cleanliness, especially in abolishing the spitting habit.

Dr. M. L. Rhein, New York: With our understanding of local infections at the present time, I am impressed with the fact that so far as the welfare of the public is concerned, it is timely for our profession to speak in no unmeasured terms in regard to things that are being done today by dentists who know better, and whose only excuse is an economic one. One most unfortunate fact is the imperfect education of the dentist. There is no place in the practice of stomatology in the future for the man who is not thoroughly educated in medicine. A great deal has been said about focal infection, with reference to alveolar abscess. I believe it is wise to divide focal infections into two classes, the one where there is a distinctive type of alveolar abscess, and the other where there is no abscess. In the dental granulomas, where there is a distinct growth of granulation tissue, with its fibrous envelope, known in the older literature of dentistry as the blind abscess, there is no abscess, and no pus formation. We almost invariably have the colonization of the *Streptococcus viridans.* In fact, these granulomas are simply filled with *Streptococcus viridans* whose low degree of virility seems to make it impossible for them to produce pus, but they seem to have the same power of producing as severe a toxin as could come from pus itself. Where we have either of these conditions present, are they the sources of metastates? During the past year I have had recourse to the streptococcus fixation complement test, introduced by Dr. Hastings. It is a most efficacious means of determining whether the individual is having a direct effect from these infections. My clinical study of cases leads me to believe that these organisms gain their entrance to the alveolar structure at the foraminal entrances of the roots due to imperfectly handled dental operations. These foraminal openings are left unsealed.

Dr. W. D. Calvin, Fort Wayne, Ind.: When emetin was first proposed as a cure I studied two series of cases, one with the use of emetin in conjunction with a careful hygiene of the teeth, in which I found some improvement; and another in which I allowed the patients to use the same mouth hygiene as previously practiced, and with the use of emetin, and in these latter cases I did not note the same improvement. I have come to the conclusion that emetin is worth practically nothing. The only point I wish to emphasize is that we should consult with our dentist brethren more than we do. As Dr. Billings stated, the mouth probably is the dirtiest place in the human system, but I do not think that we should arrive at the conclusion that it is the cause of as many of the conditions as have been attributed to it in the last two years. We should recognize that mouth infections not only act on other parts of the body, but that the mouth is acted on by septic conditions in other parts of the body.

Dr. G. R. Satterlee, New York: I, too, would like to emphasize the advantage of meetings between dentists and medical practitioners. A short time ago a paper was read before the Bronx Medical Society by a very well-known Boston dentist, who made the statement that he thought the medical profession was laying too much stress on infections from the teeth, and the gist of his statement was that he could not see how an apical root abscess with a strong peridental membrane and pericementum around it could possibly be the cause of a general infection. I do not suppose any medical man among us has failed to have at least one case where an alveolar abscess, that has been relieved by withdrawal of the tooth, has not been followed by relief of the patient's symptoms. Of course, the difficult thing is to decide whether it is a concomitant or whether it is the cause. I think we all agree that it ought to be taken care of anyway. I would like to ask the speakers one question—and particularly Dr. Billings—as to the value of the complement fixation test in the identification of different types of organisms, just what organisms can be identified by a complement fixation test; what types respond to it, and if, by injection of a vaccine of that particular type, we obtain a local reaction in some part of the body, would that reaction give any clue as to the locality of the cause of the infection ?

Dr. William C. Fisher, New York: There seems to be an idea among the medical and dental professions, and it is getting among the laity, that in order for a dentist to treat roots properly he must have the M.D. degree. No one wants the higher education of our dentist extended more than I do, but there are thousands of dentists in the United States who have only a dental college education, and have been properly trained in dental surgery. There is no excuse for any dentist not doing good root-canal work, even if he has only the education which he received from a dental college. While a medical education is of great aid to the dentist in his diagnostic work and in his collaboration with the medical man and in research work, yet I do not wish to see the responsibility lifted from the general dental practitioner who has only a dental degree, and I do not want the public and the medical profession to think that the something that was not given him in the dental college is the reason why we have this poor root work. They have sufficient technical education to do good root work, and if they do not do it, the fault is with the individual man. If a toothis divitalized and the roots have never been filled, and still the Roentgen-ray does not reveal any shaded area or subnormal area beneath the root, that is not an assurance that there is no infection there. If the Roentgen-ray shows a devitalized tooth that has not had proper root treatment, then that tooth should be opened and an attempt made to treat it. If the dentist cannot go through to the apical foramen of each and every root of that tooth, then that tooth should be extracted. My reason for that is the fact that in a case of arthritis a few weeks ago there were two such teeth, lower molars, on both sides of the jaw, that it had been impossible for myself and one other dentist to get through. I insisted on extraction, and my bacteriologic confrere reported in a few days that he had *Streptococcus viridans* from the apexes of both molars. The roentgenograms in this case were read by our most expert men, and they could not find any shading at the ends. The general practitioner was looking for a focus of infection, and we found two areas in those root sockets.

Dr. John E. Nyman, Chicago: Local infections of the mouth which cause systemic derangements may be divided into two classes. First, the open discharging variety, those that produce systemic derangement by reason of their influence on and through the digestive tract, such as discharging pockets of pyorrhea unaccompanied by pain or soreness about the teeth, and resulting in a slow systemic toxemia. Second, the enclosed form of focal infection, producing systemic derangement directly through lymph and blood vessels. The first form of infection may give rise to digestive derangement; the frequent hyperchlorhydrias without definite cause, resulting later, perhaps, in gastric ulcer; or in spastic constriction in the colon, predisposing to acute or chronic subacute attacks of appendicitis. These toxemias are sometimes related to mental derangements. I think Dr. Craig, of New York reported some twenty cases of melancholia which showed no improvement until pyorrheal conditions had been eradicated. The other form, that of metastatic infection through the lymph and blood channels, may result in such conditions as chronic arthritis, single or multiple, also in cardiac derangements with an intermittent angina, or cardiac insufficiency. Through my association with men who are in the practice of medicine, I can relate a list of diseases which were really definitely relieved, even cured, by correcting the abnormal conditions in the mouth. This list comprises arthritis, cardiac derangement, angina, hyperchlorhydria, spastic constriction of the colon, reflex neuroses, insomnia, and all forms of phobias. My experience has been that many phobias and insomnias have been due to mechanical disturbance by impacted unemptied teeth. Recently I had three cases which have been cleared up by removal of badly impacted teeth. Even if no definite systemic disturbance of any kind is reported coincident with pathologic conditions in the mouth, the continuance of these conditions in due course of time has its effect on the tissues of the body, resulting in a form of cell depreciation, so that the individual is more susceptible to an acute invasion. I am glad Dr. Irons spoke as he did concerning vaccines. There is always danger in the use of vaccines of developing a state of "sensitization" or a form of anaphylaxis. In subacute chronic arthritis we have not a disease to deal with which is ordinarily dangerous or acutely distressing to the individual, and we may, in administering a vaccine for the purpose of quickly eradicating that condition, "sensitize" the patient so that if some dangerous condition developes through meningitis, diphtheria or tetanus which requires the administration of a specific serum the injection may result in a fatality.

Dr. W. A. Price, Cleveland: I recently asked the pathologist in a hospital what proportion of the teeth he saw extracted were related, directly or indirectly, with the lesion for which they were extracted, and he said, "Not 25 per cent." Again, one of our leading medical pathologists stated that every tooth with a devitalized medical pulp was a sequestrum. Therefore, devitalized teeth must be extracted. In the researches we have been making in the Research Institute of the National Dental Association we have not been able to sterilize one single canal, so that where there was not a fistula we could not aspirate a culture from beyond that apex after the treatment. More than that, we have never been able to produce a condition in which we could not get the culture from a canal, without a fistula, where there was an apical infection within six days. This was the case, no matter what medicine was used. We tried everything, from sulphuric acid to formalin, and various medicines which we knew should not have been used in ordinary conditions, but which we used as part of the experiment. So far as I am concerned, I cannot sterilize the area beyond the tooth apex by any means, but I do believe we dentists can so change the balance of safety for that patient that we will reduce the infection and give nature a chance to destroy that infection.

Dr. Frank Billings, Chicago: I thought I stated distinctly that the reaction of pathogenic organisms invading the tissues anywhere would produce a serous, a fibrinous or a purulent exudate, and I named some other conditions. Apparently the difference in the reaction of the tissues depends on the virulence of the specific infectious agent. In the one event it is virulent enough to cause a positive chemotaxis, and leukocytes wander through the local tissues and if in sufficient numbers, we call it suppuration. If less virulent, it allows less reaction, fibrinous in character, and walls off the micro-organism. In a less virulent type and on the surface of the serous and mucous membranes, a serous exudate is caused, which may wash away the infectious agents. Therefore, a degree of pathogenesis, as we understand it, is the thing which characterizes the reaction which takes place in these tissues. Then, when we go further, and with the members of the streptococcus group attempt to say that this one does this and that one does the other thing, because it produces certain characteristic conditions on a culture medium, we are going far astray. Schottmuller classified the streptococci which are pathogenic for man. He found that one type destroyed the blood corpuscles of the medium; therefore, was hemolytic; another one produces mucous conditions, and he called it the *Streptococcus mucosus;* another one produces green halos about the colonies, with some destruction of the red cells, and he called it *Streptococcus viridans*. The theory that the *Streptococcus viridans* is the least virulent of all streptococci cannot hold, because the different strains which have the power to produce green in the culture medium have not the same virulence or pathogenicity. Nor can we say that the one that destroys blood is always a pus-producing one, because the *Streptococcus erysipelatus* does not usually produce suppuration. It has an affinity for the subcutaneous tissues and does not usually produce pus. *Streptococcus viridans*, having its source in some focal infection, may have that tropism which I mentioned, which makes it pathogenic for the endocardium. If the endocardium is scarred by an old disease, it may therefore make a better soil, and enormous vegetations are produced on the valves. There will be a constant bacteremia. It will immunize itself against the host. Another type of *Streptococcus veridans* may produce changes in joints and muscles and have no affinity whatever for the endocardium. All these organisms are the so-called endotoxic bacteria, and we are in doubt as to whether the toxin is the specific agent that produces the tissue reactions, whether it is the protein combined with the toxin that produces the reaction, or whether it is some split product of the protein, as Vaughan believes. There is something specific about it, otherwise we would not have the one producing pus, the other an erysipelas, the other infection of the heart, another acute rheumatism, another chronic affections of the muscles and joints. Therefore, when you ask about vaccines you must first of all make the bacteriologic diagnosis, to know that you are using the specific agent that causes the disease. We have attempted to study the possible value of so-called autogenous vaccines. In over five hundred cases of chronic arthritis we have compared the results of the vaccinated patients with those not vaccinated but receiving the same hygienic treatment, and the result was apparently just as good without as with the vaccines. Furthermore, where one would sometimes note a local reaction from a vaccine, the same reaction would also result from a non-specific protein.

Swallowed bacteria meet with resistance of the intact mucous membrane throughout the intestinal canal. They meet with destructive influences of the gastric juice, and it is a question always as to how many pass on into the intestine. To say that they are destroyed there and the toxins absorbed to produce general disease is going away back to our old ideas of autoinfection or autointoxication. If intestinal infection does occur, it must mean that the organisms are viable enough, resistant enough, to pass the barrier of the stomach, reach the intestine and pass into the mucosa, and from that into the lymphoid structures of the mesentery, and there form a new focus. Practically, general infection occurs hematogenously or lymphogenously. Even if the lymphogenous infection occurs first, the infectious agents pass from the lymph nodes into the blood stream, and finally, therefore, the route of infection is hematogenous. We must get away from our old ideas of toxin absorption from a focal infection or from the gastro-intestinal tract as causing general disease.

Finally, when we come to therapy dentists need not feel at all mortified about what they do. It is not a question always, I think, of technic in dental practice. It is a question as to how you are going to get rid of existing conditions. The condition of the host is important, not only in primary infection, but in the continued infections as well. If the dentist does not recognize that the condition of that patient whose mouth he is treating requires that he should go to some doctor who is wise enough to build up his natural defences by hygienic measures, then the dentist is not doing his part for the patient. If the doctor to whom the patient is sent by the dentist, because he finds focal infection about the jaws, does not recognize that focal infection is more dangerous in individuals who are debilitated and does not do his part, he should not blame the dentist because he does not eradicate the focus.

Dr. F. B. Moorehead, Chicago: The one vital thing that the dentist must face in this matter of chronic infections is this: He alone is responsible for the removal of infection from the mouth. It is a demonstrable fact that certain well-defined infections may result from foci about the teeth. Whether at the time the patient may be sick or well there is always a margin of doubt, a margin of contingent disability that the patient must be guarded against. The dentist, therefore, must make certain that the tissues have been placed in a state of health before the patient leaves his hands. In the hands of highly trained men certain conservative measures may be undertaken, but the general practitioner, the average man, may not assume the role of a specialist. The tissues of the mouth should not be looked on with an unwarranted suspicion. Infections about the teeth should be regarded in the same light as infections involving the appendix, gall-bladder or the tonsil. It would seem to be a matter of plain, ordinary common sense to remove infection wherever it may be found.

Washington.—Gangway please, and make a place on your Rand-McNally for the little town of Saco, Montana, with a population of two hundred, as per the 1910 census report.

Saco has thirty-two of its male citizens serving with Co. G, Second Montana Infantry, now on the border, and another stalwart son serving at Pekin, China, as a member of the United States Marine Corps.

"If New York, Chicago and Philadelphia could be induced to give their sons in the same proportion", writes W. D. Miller, editor of the Saco Independent, to the Marine Corps officials in this city, "we'd have some real preparedness."

But in the meantime Saco wants to cast considerable shadow from its new place in the sun.

*EXTRAORAL CONDUCTIVE ANESTHESIA FOR ORAL SURGICAL OPERATIONS

BY KURT H. THOMA, D.M.D., BOSTON, MASS.

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THE POSSIBILITY to fully control the pain in operations about the mouth and jaws by conductive anesthesia may be called the greatest progress in oral surgery that has been achieved in the last decade. Local anesthesia does not only free the region of the operation from the presence of the anesthetist and his appliances, but also eliminates the dangers attending general anesthesia, namely the swallowing and aspiration of blood and pus. The absence of vomiting after the operation is another advantage eliminating the disintegration of the wound by the vomitus. The partial cooperation of the patient during the operation, the hemostatic action of the injections which makes the operation less bloody, and the absence of certain instruments used to administer the anesthetic or to open the mouth make possible aseptic methods and better technic.

Notwithstanding these great advantages we must, however, select our cases. Children as a rule are poor subjects for large surgical operations under local anesthesia; also sometimes very intelligent older children form exceptions, but even then it depends a great deal on the extent of the operation. Amongst the adults there are, of course, those who will only consent to an operation when performed under general anesthesia, while many patients for whom general anesthesia is contra-indicated and dangerous can well be taken care of with the local methods. The excitable, nervous, and timid patient who dreads knowing what is going on, or is afraid of the instrumentation, can almost always be taken care of easily by proper pre-anesthetic medication.

The larger number of dental and oral surgical operations can be performed under anesthesia produced by the intraoral methods. The extraoral methods are indicated: 1. For all extensive cases where a large area is to be anesthetized and when the common nerve trunk supplying this area is not accessible from the mouth. This is especially the case for operation about the upper jaw.

2. For cases where deep penetration of the tissue is necessary to reach the nerve trunk we should prefer the extraoral methods to the intraoral ones, as they permit perfectly aseptic technic and therefore eliminate the danger of infection.

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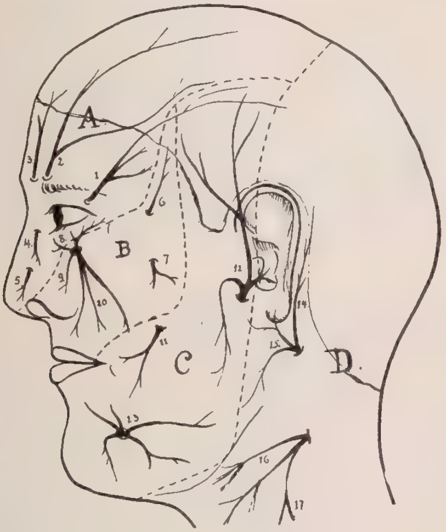
*Read before the joint meeting of the Interstate Association of Anesthetists and National Dental Association, at Louisville, Ky., July 27, 1916.

SENSORY INERVATION OF THE ORAL REGIONS.

The success of local anesthesia depends a great deal upon the exact knowledge of the sensory innervation and nerve anastomosis of the parts to be operated on. A clear picture of the nerves and anatomical relations of the surrounding parts should be constantly before the anesthetist's mind.



LATERAL VIEW OF FACE SHOWING NERVE SUPPLY OF SKIN.

1. Lachrymal N. 2. Supraorbital N. 3. Supratrochlear N. 4. Infratrochlear N. 5. Ext. nasal N. 6. Zygomatic-temp N. 7. Zygomatic facial N. 8, 9, 10. Palpepral, nasal and labial branch of infraorbital N. 11. Buccinator N. 12. Auricolo-temporal N. 13. Mental N. 14, 15. Post. and ant. great auriculor N. 16, 17. Sup. and inf. cutaneous Coli.

A—Supplied by 1st division of V. B—Supplied by 2d division of V. C—Supplied by 3d division of V. D—Supplied by cervical nerves.

Figure 1

1. TEETH, ALVEOLAR PROCESS AND GUMS OF UPPER JAW.

Incisor region	teeth and labial part	ant. sup. alveolar	infraorbital	2d Division of V.
	palatal part	naso palatine	spheno-palat. G.	
Bicuspid and molar region	teeth and buccal part	middle and post. sup. alveolar	infraorbital	
	palatal part	ant. palatine	spheno-palat. G.	

2. TEETH, ALVEOLAR PROCESS AND GUMS OF LOWER JAW.

Ant. region to 1st Bicuspid	teeth	inf. alveolar	inf. alveolar	3d Division of V.
	labial part	mental		
	lingual part	lingual		
Post. region from 2d bicuspid to 3d molar	teeth	inf. alveolar		
	buccal part	buccinator		
	lingual part	lingual		

3. INERVATION OF UPPER JAW, MAXILLARY SINUS, AND LOWER JAW.

Upper Jaw		entire		2d Division of V.
Max. Sinus	external part	sup. alveolar branches	infraorbital	2d Division of V.
	internal part	nasal branches	spheno-palat. G.	
Lower Jaw		entire sensory branches		3d Division of V.

4. INERVATION OF PALATE, CHEEKS, TONGUE, FLOOR OF MOUTH, LIPS.

Hard Palate	ant. part	naso. palatine		2d Division of V.
	post. part	ant. palatine		
Soft Palate	soft palate	mid. and post. palat.	spheno-palat. G.	
	uvula	mid. and post. palat.		
Cheeks	mucous membrane	buccinator		3d Division of V.
Tongue	ant. part	lingual		3d Division of V.
	post. part	lingual branch		Glosso-pharyngeal
Floor of Mouth		lingual		3d Division of V.
Lips	upper lip	labialis superior	infraorbital	2d Division of V.
	lower lip	mental	inf. alveolar	3d Division of V.

5. INERVATION OF THE SKIN OF FACE AND NECK.

Skin of outer cantus	Lachrimal		1st Division of V.
Upper Lid, Forehead and Crown	Supra-orbital	Frontal	
Skin of Inner cantus	Supra-trochlear		
	Infratroclear	Naso-ciliary	
Tip of Nose	Ext. nasal		
Ant. part of Temple	Zygomatico-temp.	Zygomatic	2d Division of V.
Molar region	Zygomatico-facial		
Lower Eyelid and ant. part of cheek	Palpepral	Infraorbital	
Ala of nose	Nasal		
Upper Lip	Labial		
Angle of Mouth	Buccinator		3d Division of V.
Ant. part of Auricle, Temple and Cheek	Auricolo-temporal		
Lower Jaw and Chin	Mental	Inf. alveolar	
Angle of Jaw	Ant branch of great Auricular		Cervical Plexus
Post. Auricular region	Post. branch of great Auricular		
Inf. border of Jaw	Sup. cutaneous Coli		
Ant. part of Neck	Inf. cutaneous Coli		

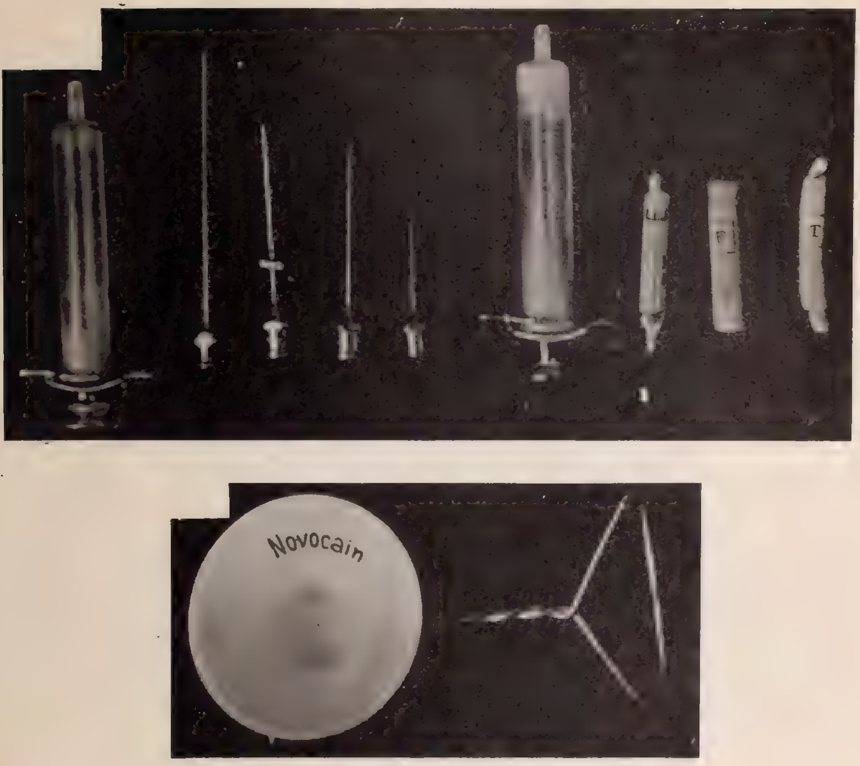


Figure 2. INSTRUMENTS. Cup to dissolve novocain. Luer syringes containing 5 cc. Assortment of needles. E, F and T tablets.

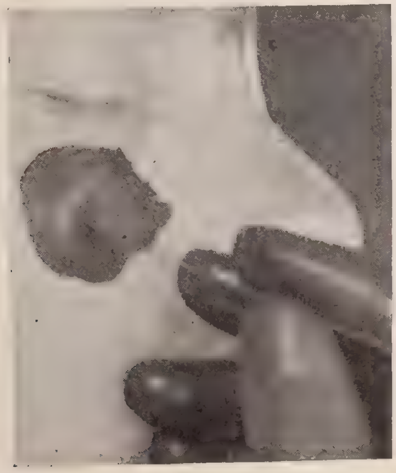


Figure 3. Shows the needle about to be inserted into the infraorbital foramen. Ordinarily I use a short and very fine needle for this purpose.

PRE-ANESTHETIC MEDICATION

For ordinary dental or small oral surgical operations, no special preparation is required. Extremely nervous patients and children may receive Bromural-Knoll, (alphabrom isovalerylurea), which is an excellent sedative.

If extraoral injections are used, pre-anesthetic medication is always indicated. For small operations Bromural is sometimes sufficient, but for deep injections followed by a severe operation I give Veronal gr. X before retiring and Morphia gr. 1-3, thirty minutes before the operation. This stupefies the patient sufficiently so as not to mind the insertion of the needle. It also takes away the terror of the operating room and instrumentation, which are otherwise more or less feared by the patient.

INSTRUMENTS AND DRUGS

Figure 2. For the extraoral methods I use a Luer or Record syringe, containing 5 cc. and steel needles of various lengths.

For the anesthetic I use a 2% novocain solution with 0.000,02 gram. suprarenin synthetic to one cc. This is prepared in the novocain cup immediately before use, by dissolving the T* or a combination of E* and F* tablets in ringer solution. For local injections which are sometimes used in addition to the conductive method in order to control anastomosis or bleeding, I use a solution containing more suprarenin, namely 0.000,05 to one cc., prepared by dissolving one E tablet in one cc.

TECHNIC OF ADMINISTRATION

Extraoral injections must be made under strict aseptic conditions. He who is not familiar with surgical aseptic methods should not undertake to use extraoral anesthesia.

The skin of the patient's jaw is prepared for the injection by application of tincture of iodin over a large area. The washing and shaving of the skin should be undertaken a reasonable time before the operation.

If pre-anesthetic medication is used, no special application is needed to reduce the pain from the needle. A small amount of the solution is injected under the skin. After the needle is fully inserted suction should be applied before injection. If blood is drawn into the syringe it is a sign that the point of the needle entered a vessel. It should then be withdrawn a short distance.

A. MAXILLARY ANESTHESIA

1. *Infraorbital Method.*

Figures 3 & 4. LANDMARKS. The infraorbital foramen can be palpitated easily under the inferior border of the orbit.

INJECTION. A very fine needle is inserted directly into the infraorbital foramen from the surface of the skin a distance of about 1½ cm. It is import-

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*Farbwerke Hoechst, New York.

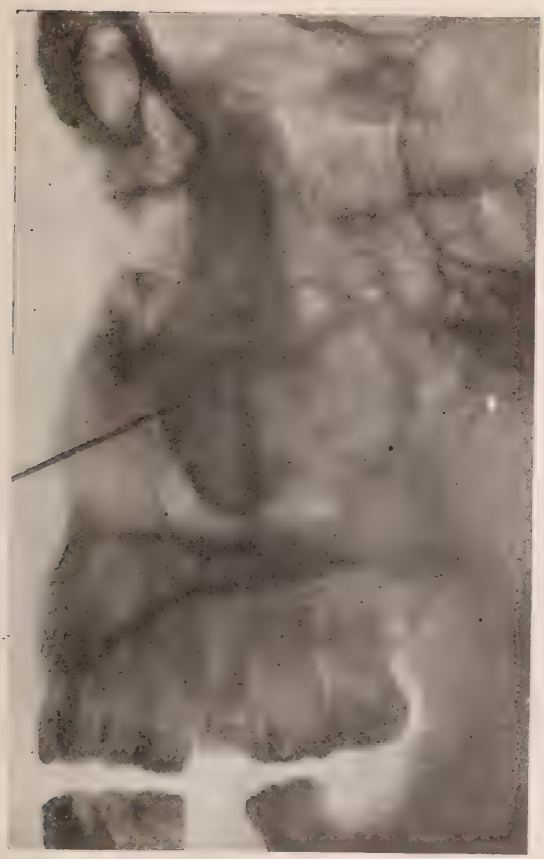

Figure 4. Radiograph showing the needle inserted into the infraorbital foramen.

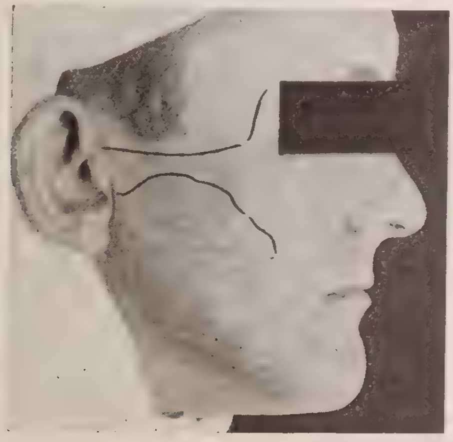

Figure 5. This slide shows the outline of the bony landmarks for the zygomatic and maxillary injection. Find the zygomatic angle and draw a line from this point vertically downward. ½ cm. below the place where this meets the inferior border of the zygomatic process is the point for the insertion of the needle.

ant to make sure that the needle is not inserted into a vessel which would be indicated by discharges of blood. 1½ cc. is injected with low and even pressure.

WAITING PERIOD. The anesthesia usually occurs in a very short time.

AREA ANESTHETIZED. Same as in the intraoral method; namely, the upper incisor teeth, labial part of gum and the area supplied by the palpepral, nasal and labial branch of the infraorbital nerve.

DURATION OF ANESTHESIA. In this method we do not depend upon infiltration of the anesthetic solution through the infraorbital foramen, as in the intraoral method, and therefore get a quicker and more lasting result.

2. ZYGOMATIC AND MAXILLARY METHOD

The intraoral methods of conductive anesthesia of the upper jaw have never been as satisfactory as those of the lower jaw, because there is no place where the blocking of the whole maxillary division can be undertaken successfully from the inside of the mouth, and because the point of inserting the needle is not remote enough from the field of operation to come outside the disease zone in extensive lesions. Nevertheless we can well take care of the teeth and their immediate surroundings with the intraoral conductive and the infiltration methods. But for large surgical operations in the oral cavity, and especially in war surgery the maxillary injection is a great advantage.

Figure 5. LANDMARKS. Palpitate the superior border of the zygomatic arch and find the place where it forms a right angle with the superior margin of the orbit. This is called the "zygomatic angle." From this point draw a vertical line downwards, and the point for insertion of the needle is about ½ cm. below the place where this meets the inferior border of the zygomatic arch.

ZYGOMATIC INJECTION. With the teeth in occlusion insert the needle with syringe mounted. A few drops are injected under the skin. Advance in a vertical direction to the cheek for two to three cm. Here we strike the maxillary tuberosity. If only the posterior molars are to be anesthetized, the injection can be made here and we have the extraoral method of the zygomatic injection.

Figures 6 & 7. MAXILLARY INJECTION. If the whole upper jaw is to be anesthetized, we continue in the same direction. Sometimes it is necessary to direct the needle a little further backwards to pass by the tuberosity which is felt for orientation, and enter the spheno-maxillary fissure. After further advance of two cm., we again find bony resistance when the point of the needle strikes the inferior part of the anterior surface of the larger wing of the sphenoid bone, just below the foramen rotundum. The depth at this place is about five cm. One to two cc. is injected. The injection is purposely made below the foramen to keep away from the nerves supplying the eye.

Symptoms of Anesthesia. After about five minutes the patient feels numbness in the nose, sometimes also in the upper lip, but the symptoms are much less marked than in the lower jaw.

Waiting Period. Complete anesthesia usually occurs in from ten to fifteen minutes.

Area Anesthetized. Practically all the parts supplied by the maxillary division are anesthetized, the maxillary bone, the teeth, the gum, half of the palate and upper lip, the anterior part of the cheek, the skin of the nose, the antrum and part of the nasal cavity.

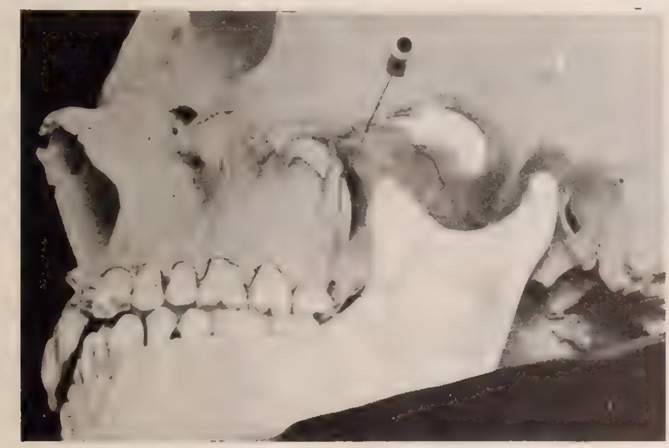

Figure 6. Shows a skull with the needle in place to anesthetize the second division of the fifth nerve below the foramen rotundum.

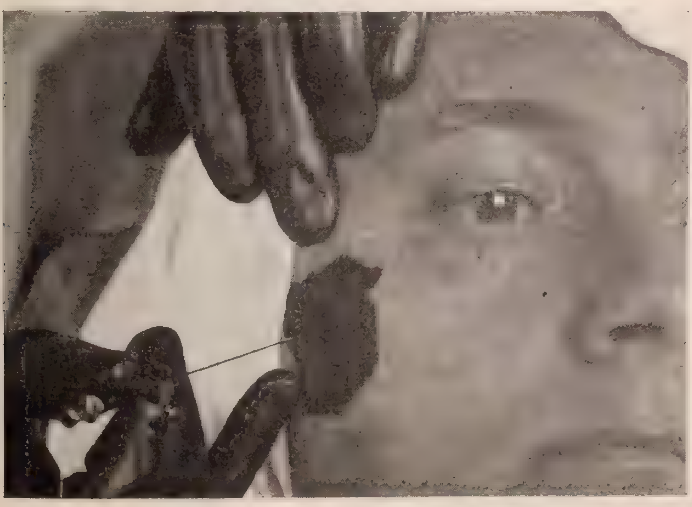

Figure 7. Shows the needle about to be inserted for the extraoral maxillary injection.

Anastomosing and Communicating Nerves. Branches from the other side have to be considered and the facial branches of other divisions of the fifth.

Duration of the Anesthesia. The anesthesia lasts from two to three hours.

Undesirable Symptoms. Anemia in the region of the infraorbital artery sometimes causes circumscribed whiteness on the part of the cheek which is supplied by it.

Diffusion of the solution into the orbit is liable to occur, causing occular disturbances of short duration. The occulomotor or abducens nerve may be infiltrated causing double sight, weakness in the upper eyelid, dilation of the pupil and if some of the accompanying vessels are affected, anemia of the eyelids will be observed. Sometimes anesthesia of the soft palate gives difficulty in swallowing. All these complications, which occasionally accompany the anesthesia last from fifteen minutes to two hours and are of no serious consequence, merely inconveniencing the patient for a short time. The patient should be told that these conditions occur at times and that they are of a harmless nature, so that he will not be frightened and lose his confidence. As this method is only used for operations of a serious and extensive nature, we can consider the occasional occurrences of the complications a small factor compared with the advantage of positive asepsis and the disadvantages of general anesthesia for such operations in the mouth.

B. MANDIBULAR ANESTHESIA

1. *Extraoral Pterygo-mandibular Method.*

This injection is made into the same place as the intraoral one; namely, the pterygo-mandibular space. It is indicated whenever the intraoral method cannot be used, as is often the case in fractures of the mandible and trismus of the muscles of mastication.

Figure 8. Landmarks. A line is drawn from the tragus of the ear to a point marked by the anterior margin of the masseter muscle and the lower border of the mandible. The point where the mandible is divided into two halves marks the projection of the mandibular foramen upon the skin. The place to insert the needle is at the inner side of the lower border of the mandible, 2 cm. anterior to the angle of the ramus.

Figure 9. Position of left hand for the injection on the right side. Place index finger behind and parallel with the posterior border of the ramus, the thumb in the same direction, its tip touching the lower border of the ramus.

Position of the right hand for injection on the left side. The left arm is passed around the patient's head, the thumb is placed behind the posterior border of the ramus and the index finger bent around the angle of the ramus. The head is bent towards the opposite side. The dismounted needle is now inserted at the point described.

Figure 10. Advance in a parallel direction to the posterior border of the ramus, marked on the left side by the thumb and on the right side by the index finger. After the needle has been inserted about four cm. we are in the pterygo-mandibular space, and as the direction of the needle is parallel with the nerve, it does not matter if the needle is inserted a little too far. Inject two cc.

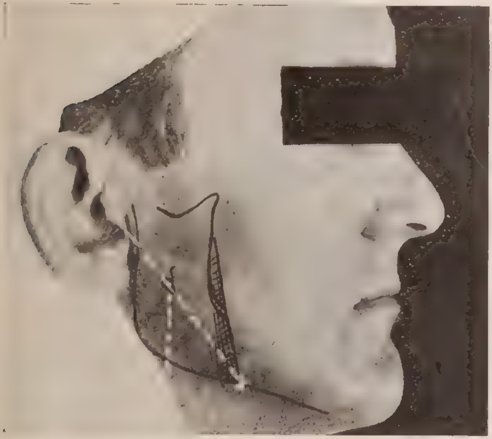

Fig. 8

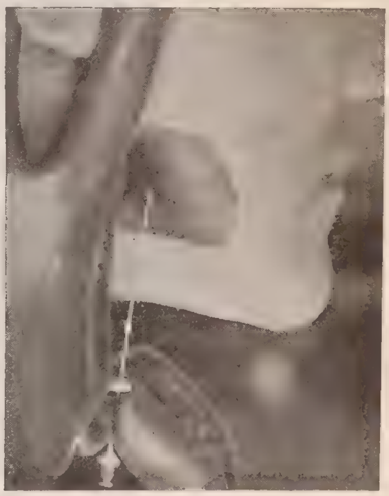

Fig. 9

Figure 8. Landmarks to find projection of the mandibular foramen upon skin. Draw a line from the tragus of the ear to the point where the anterior border of the masseter meets the inferior border of the mandible. Divide in halves. The point of division marks the location of the foramen.

Figure 9. Shows the needle about to be inserted for the extraoral pterygo-mandibular injection.

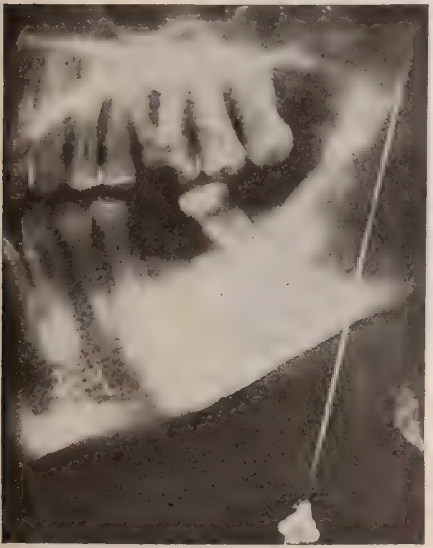

Fig. 10

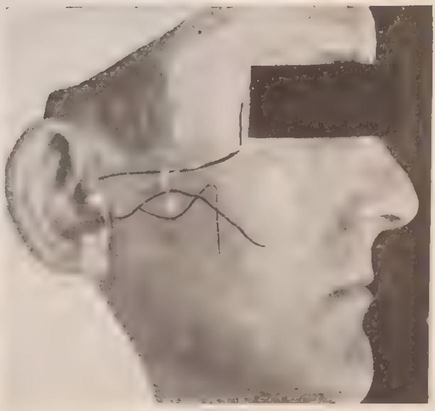

Fig. 11

Figure 10. Shows a radiograph with the needle inserted for the extraoral pterygo-mandibular injection.

Figure 11. Shows landmarks for mandibular injection.

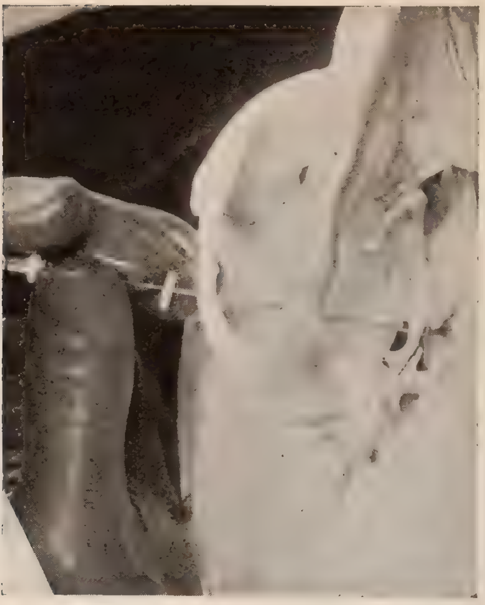

Figure 12. Shows a skull with the needle inserted to anesthetize the third division of the fifth nerve.

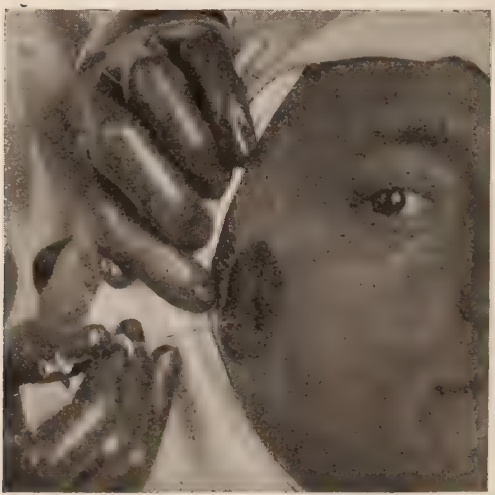

Figure 13. Shows the needle about to be inserted for the extraoral mandibular injection.

Symptoms of Anesthesia. Numbness of the lip is felt about five minutes after the injection.

Waiting Period. Anesthesia takes effect in fifteen minutes.

Area Anesthetized. The lower teeth and jaw on the side injected, the lower lip and anterior part of gum.

Anastomosing and Communicating Nerves. The inferior alveolar nerve on the other side anastomosing in the incisor region and the lip. The lingual nerve supplying the inner part of the gum. If anesthesia of this nerve is required, it has to be taken care of separately. This can be done in two ways, either by withdrawing the needle about 1 cm. and reinserting it in the vertical direction which brings it further forward, or by inserting the needle 5 cm. which brings it higher up near the place where the inferior alveolar and lingual nerve divide.

Duration of Anesthesia. Same as for the intraoral method; namely, about one hour if 2cc. is injected.

Failures. The advance of the needle may find bony resistance in the depth of 3 cm. This comes from false direction of the needle point, striking a well-marked internal oblique line. The needle may strike bone at once, which may indicate a well-marked protuberance for the attachment of the pterygoid muscle. These mistakes are remedied by changing the direction of the needle.

2. MANDIBULAR INJECTION

Anesthesia of the mandible can be accomplished very successfully by the intra and extraoral method of injecting into the pterygo-mandibular space. For the operations on the ramus, especially the superior part, and if the pterygo-mandibular injection is contraindicated on account of pathological conditions, we may resort to the mandibular method.

Figure 11. Landmarks. A line is drawn from the zygomatic angle to the tragus of the ear. Divide into halves just below this point and the inferior border of the zygomatic arch is the place to insert the needle.

Figures 12 & 13. Injection. Insert the needle and advance in a slightly upward direction. The needle passes anterior to the neck of the condyle and below the zygomatic arch. A few drops may be injected at once. After advancing to a depth of 3 to 4 cm. the point of the needle should strike the smooth infratemporal surface. Now feel your way along for one more cm. until you strike the mandibular nerve, when the patient notices suddenly a radiating pain in the region supplied by it. Inject from 2 to 5 cc.

Symptoms of Anesthesia. The same as in the pterygo-mandibular injection.

Waiting Period. Ten to twenty minutes, depending on how close we get to the nerve and on the amount of solution used.

Area Anesthetized. Teeth and bone of the mandible, lower lip, chin, corner of the mouth, lower part of the cheek and temporal region.

Anastomosing and Communicating Branches. The anastomoses from the other side and in some operations, branches of the cervical plexus.

Extraoral methods of anesthesia for the mouth are not original with me. Such methods have long before been described by Braun and his scholars, but have never become very popular.

I hope, however, that the simplified methods presented here and the fact pointed out that such methods are less dangerous than similar ones undertaken from within the oral cavity, on account of perfect asepsis, will be found not only a great help to the oral surgeon, but a benefit to the public in general.

43 Bay State Road.

CHAIRMAN'S ADDRESS*

BY HUGH W. MAC MILLAN, D.D.S., CINCINNATI, OHIO.

THIS IS truly an auspicious occasion and one teeming with great opportunities for the future. This is the first time in history that two first class organizations, representing the medical and dental professions, have met on equal terms to discuss vital subjects of common interest. This is the moment to which leading thinkers of both professions have looked forward eagerly, and in this common meeting their ideals, so fondly cherished, are consummated.

It is particularly fitting that this union occur in the discussion of the subject of anesthesia. No greater gift has been given to humanity than the wonderful endowment of loss of sensibility to pain. It seems hardly possible to younger men in the profession that the first general anesthetic, nitrous oxid, was administered only seventy-two years ago. In the days of our grandfathers, cracked ice, Indian hemp, opium and alcohol were the agents used to diminish the agony of the suffering. In these days of modern surgical procedures, by the aid of trained anesthetists, and by the employment of anesthetics best suited to the case, operations can be performed which were not dreamed of seventy-five years ago.

As a coincident to this common meeting, it is an interesting fact that dentists and physicians have shared equally in the discovery and early development of anesthesia. In Hartford, Connecticut, a tablet has been erected on the wall of the building now occupying the site of the building in which Dr. Horace Wells' office was situated. The tablet bears the following inscription:

> "ON THIS SPOT HORACE WELLS, DECEMBER 11, 1844,
> SUBMITTED TO A SURGICAL OPERATION, WHEREBY HE
> DISCOVERED, DEMONSTRATED AND PROCLAIMED THE
> INESTIMABLE BENEFITS OF ANESTHESIA."

There is also a monument in Hartford, to Wells, erected by the State of Connecticut and the City of Hartford. The citizens of Boston erected a marble monument to Morton in Mount Auburn Cemetery with the following inscription:

> WILLIAM THOMAS GREEN MORTON
> INVENTOR AND REVEALER OF ANESTHETIC INHALATION
> BEFORE WHOM IN ALL TIME SURGERY WAS AGONY
> BY WHOM PAIN IN SURGERY WAS AVERTED AND ANNULLED, SINCE WHOM SCIENCE HAS CONTROL OF PAIN.

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*Read at the joint meeting of the Interstate Association of Anesthetists and the National Dental Association, at Louisville, July 27, 1916.

At the present day, members of both professions are equally prominent in the administration and research work connected with this great subject.

Reading from the Constitution of the Interstate Association of Anesthetists:

"The objects of this Association shall be to advance the science and practice of anesthesia and analgesia; to promote the teaching thereof and to conserve the interests of anesthetists."

Its members are composed of licensed practitioners of medicine and dentistry, interested in anesthesia and analgesia.

It has been asked what advantages would the general practitioners of dentistry derive from being a member of this society? It becomes the unwritten obligation of every individual entering a profession to strive to make that profession better for his presence. The watch-word of today is Service. Men more clearly realize the truth of the old saying

"What I kept, I lost;
What I spent, I had;
What I gave, I have."

One of the objects of this Association is to establish the teaching of anesthesia and analgesia in the curricula of all medical and dental colleges. The great majority of graduates enter the practice of their profession with no thought of advancing the methods or educational requirements of their professional schools. They daily witness shortcomings in the education of future associates without even suggesting better plans or endorsing those men who are working for better conditions. The status of a profession is not in the ideals of that profession, but in the general average of its members. One of the greatest pieces of service which the individual dentist can render is to obtain membership in this organization and insist that the education of dental and medical students in anesthesia be improved. Until all professional schools are conducted for the benefit of humanity and not for private gain, supervision of them is not only necessary but should be considered by each individual as his professional obligation.

Another opportunity for the general practitioner to advance the standards of his profession is to ally himself with a body of men which is striving to guide the legislators in the various states to pass laws which will truly serve the medical and dental professions, as well as the general public. One of the most reprehensible propogandas against dental anesthetists occurred only last year in New York state. The bill as it entered the New York legislature was known as "A Bill to Regulate the Administration of General Anesthetics by Persons other than Licensed and Registered Physicians."

The following is the bill:

"The administration by any process, of any substance, liquid or gas, commonly called a general anesthetic, for the purpose of producing unconsciousness, shall constitute the practice of medicine and surgery, even if undertaken in the presence of, and by order of, a licensed and registered physician, surgeon or dentist, with the following exceptions:

Section 1. "A licensed and registered dentist may administer any general anesthetic for any operation which such a dentist can lawfully perform, but not for any operation which a dentist cannot lawfully perform, even if a licensed physician is present and directs such dentist to administer such general anesthetic, except as hereinafter provided.

Section 2. "In any case of sudden severe illness or sickness in which the licensed physician or surgeon in attendance upon the patient conscientously believes that the delay necessary to obtain the services of another licensed physician to administer a general anesthetic will endanger the life or health of the patient, that attending physician or surgeon may employ any reliable person to administer such general anesthetic in his presence and directly under his instructions, but not in his absence. The employment in this manner of any person other than a licensed and registered physician to administer any general anesthetic must be strictly limited to emergencies in which the services as anesthetist of licensed and registered physician, cannot be quickly and easily obtained, and must not be a regular or habitual practice.

"Nothing contained in this statute shall be construed to prohibit necessary practical instruction in the administration of general anesthetics being given to registered medical students by licensed physicians or to registered dental students by licensed dentists or licensed physicians; always provided that while giving such instruction, the instructor devotes his entire attention to teaching and neither operates nor does any medical, surgical or dental work not connected with the administration of a general anesthetic."

Commenting on this bill, the editor of the Anesthesia Supplement of the *American Journal of Surgery* writes: "The Editor of the Supplement submits that this statute, if passed as printed, will not accomplish its purpose, but will involve dental and surgical anesthetists in a maze of difficulties.

"While the Supplement is making every effort to abolish the evils involved in the administrations of anesthetics by non-medical anesthetists, it cannot subscribe to the limitations this statute intends to place on the dental anesthetists, and it is hoped that dental associations in New York will give this matter their immediate attention.

"This effort to differentiate the respective prerogatives of dental and surgical anesthetists is reprehensible and in direct contravention to the spirit of amalgamating the interests of both professions, which is leavening the American professions of medicine and dentistry.

"Section 2 of this statute simply leaves a loophole for future violations of the law; while the final paragraph shows how absurd a propoganda of reform may become under the lash of misguided enthusiasm. This section if strictly interpreted and enforced would utterly abolish dental anesthesia clinics as they have been held for years in connection with state and national dental association meetings.

"Moreover, it would imperil the future of analgesia, as a technic of pain alleviation, in which the surgeon or dentist both administers the anesthetic and operates, and teaches."

Through its official Journal the Association prints the papers presented at its various meetings and is enabled to carry out its policies for the advancement of anesthesia. This association was able to halt the legislation on this bill and to secure the substitution of another bill which placed the medical and dental anesthetist on equal footing.

One of the greatest advantages of this common meeting to the individual dentist is, that it gives him an opportunity to learn improved methods and to obtain the latest information on the subject of anesthesia. The average medical or dental student is not prepared to pass a fair examination from the knowledge of anesthesia which he acquires during his college course. The medical student's knowledge is obtained by giving anesthetics in his internship. The dental student memorizes sufficient answers to pass the state board. That this information necessary to administer scientifically an anesthetic can be obtained, is evidenced by physicians and dentists of international reputation present here today who have educated themselves in this science.

One of the greatest evidences of advancement in dentistry is the change of attitude regarding reading and studying. Laws which were supposed to be fundamental have changed until it is necessary really to study to keep within reach of these present-day investigations. In this program of today, methods never before written, illustrations never before shown in any text-book, will be presented to you by the speakers who are to follow.

The present high standards established by physicians and dentists demand the most efficient organization and cooperation to culminate its purpose. We must remember that each one of our professions is but a part of the vast mosaic of biology. We must sacrifice personal feelings and professional prejudices to the great cause of advancement in the science of life. Only by the aid of each individual can these things be accomplished and may each be sufficiently recompensed by the privilege of doing his part.

> The times are waiting for men who shall serve and not merely inquire; strive and not merely investigate; give to their age and their kind not so much learning in bulk as wisdom in action; great doing as the only true fruitage of great thinking; the consecration to the uplifting of one's fellow men of one's best, rather than the conserving by mere culture of one's self.—*H. C. Potter.*

THE PREPARATION OF ROOT SURFACES IN TREATING .PYORRHEA*

BY G. C. BOWLES, D.D.S., DETROIT.

THE PREPARATION OF ROOT SURFACES implies that some pathological change has involved the peridental membrane and the cementum necessitating surgical measures for its arrest and cure.

Before considering the pathological conditions with which we have to cope it may be well to review, briefly, the anatomy and the histology of the tissues involved.

This chart shows how beautifully the teeth are swung in their bony sockets and supported against all normal stresses by the varied direction of the fibers of the peridental membrane. Note that the gum tissue—the septal gingivæ—fills the interproximal spaces almost up to the contact points of the teeth. These fibers, the free gingivæ group, arising from the cementum just below the enamel line, turn sharply upward and support the gingivus in its hug-like adaption to the tooth. Forming the floor of the subgingival space these fibers are particularly liable to injury. A comparatively shallow pocket will cut off these fibers, cause the gingivus to recede and convert its knife-like margins into a thickened shelf or shoulder. This favors the retention of food debris and during mastication food is not so readily diverted from the subgingival space. Any departure from the normal form and contour of the gingivæ is a menance to the health of the tooth and its investment.

It behooves us therefore to be keenly on the alert to detect the first symptoms of gingivitis, the forerunner of pyorrhea, and to remove their cause.

Note that these fibers immediately below the free gingivæ group, arise from the cementum of one tooth, cross the interproximal space and are inserted into the cementum of the opposite tooth. This trans-septal group of fibers has a most important function, that of preserving normal contacts. According to Black, faulty contacts are responsible for more pyorrhea than any other cause. A gingivitis on, say, the mesial of a tooth lowers the tonicity of the trans-septal fibers and permits the fibers of the opposite side to exert an undue pull thus separating the contacts. Fibrous food wedges in, increasing the mechanical and infectious irritation and a pocket is sure to follow if the trouble is not discovered early and corrected.

How many of us think it necessary to carefully examine and restore faulty contacts as a routine prophylaxis procedure? And yet without it prophylaxis is not prophylaxis for it does not prevent. Of what use is it to carefully plane and polish the proximal surfaces of the teeth if with the next meal the interproximal space is left wedged with fermenting food stuff to immediately begin re-etching those surfaces? Unless these contacts are restored and every other source of mechanical and infectious irritation is removed there is no use wasting time on the preparation of the root surfaces.

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*Given as a Clinic before the Michigan State Dental Society, 1916.

This model reproduces most of the causes leading up to pyorrhea, conditions we meet every day, some of them are present in almost every mouth, and yet we pass them by, many of them, without a word of warning to the patient or without making the slightest effort to correct them. And then we say pyorrhea cannot be cured or prevented because it is in the blood, because the wicked endomœba is on the job. This toboggan slide filling couldn't be better designed to ruin the septal gingivus. This one on the mesio-occlusal is a little better but it is guiltless of all anatomical form, no suggestion of sulci or marginal ridge. This crowned-while-you-wait, tomato-can-crown completely obliterates the interproximal space and during mastication saws upon the alveolar crest fibers of the membrane. This specimen is just as it fell out of the mouth. This filling is packed solidly against the approximal tooth to a point well below the normal gum line. It makes a broad and continuous contact, impossible to clean and a source of constant irritation. A cervical filling with the margins under the gum overhanging and rough. These teeth are in mal-occlusion. They are subjected to unnatural stress, they are difficult to keep clean and about them tartar and infectious deposits are collected. On this side the first molar was extracted, the second molar has tipped forward into the space. Occlusion is spoiled and the formation of pockets mesially and distally are invited. The second biscuspid has moved back and the contacts as far as the cuspid are opened. And last, but by no means least, an alveolar abscess discharging at the gum margin.

This is not uncommon and is frequently mistaken for pyorrhea and given heroic and damaging treatment and of course without results. Make very sure that the pus discharge is not from an abscess before attempting to treat it.

Pyorrhea in its early stages can be treated successfully by any one who is willing to give a little serious study of the conditions to be corrected and to checking up his technic for their correction.

Carefully study the roots of the next pyorrhetic tooth you extract. Then select a rubber tube that will hug the tooth closely at the gum line—the bulb from a medicine dropper is just the thing—rub a little vaseline on its inner margin and slip the tooth into it up to the crown. Then with whatever instrument you are using try to remove all calculus and infectious deposits and leave the cementum with a smooth and polished surface. Try it and continue to try it until you have found the instruments and developed the technic which will enable you, out of sight, to detect by the developed sense of touch when such a surface has been attained.

This tooth shows what I have been able to accomplish, in this manner, with the James modification of the Carr planes and this tooth shows very similar results obtained with the U. of M. set of files. I use and prefer the planes but for the average practitioner they are too costly and too difficult to obtain so I am not supposed even to mention them. Good work can be done with the U. of M. files though it takes longer and there are positions where they will not reach. This tooth shows the best I could do with the pyorrhocide scalers with the root out of sight in the rubber tube. It is very badly gouged. I believe it is impossible to get a smooth surface with narrow blades with sharp cutting angles such as these scalers have. The blade of any hoe-shaped scaler intended for use under the gums should have its angles rounded.

I flush the pockets frequently, during the planing process, with 5% salt solution and use no drugs whatever.

He who would undertake the treatment of pyorrhea in its more advanced stages must understand that it is a time-consuming process and that all infected teeth cannot be saved. To splint and retain infected teeth without obliterating the suppurating pockets, is, in the light of present knowledge, not far from criminal mal-practice. It is as bad to tell the patient to keep his pyorrhetic teeth until they are ready to fall out as nothing can be done for them.

We must do something, every one of us. The suppuration must be stopped. If it cannot be done by treatment then by extraction. We cannot temporize longer.

ENAMEL SURFACES*

BY RUTH S. MATHESON, D.D.S., DETROIT.

WHAT I WISH TO DEMONSTRATE is the method which up to the present time, I have found most efficient in securing the ideal or at least nearly ideal enamel surface.

To obtain this ideal enamel surface is an operation consuming a considerable length of time. So any method, manner or substance we may use whereby the time consumed in doing this work may be reduced, will help to make it a more practical procedure for the greatest number of dentists.

We have all come to realize the importance of this ideal enamel surface in the prevention of caries and oral sepsis. For it is at the enamel surface alone that the process of caries may be prevented or checked either naturally or by artificial means; once past this point it is merely a matter of time before we have a total destruction.

Most of our authors and histologists have confined themselves to the minute structures of the enamel body, but very little has been given us regarding the surface structures of the enamel; with the exception of Pickerill, who in his book entitled "Prevention of Dental Caries and Oral Sepsis," states that he has concluded that the enamel surface of human teeth and some animals normally is not smooth. It is in its normal condition traversed by minute ridges separated from each other by corresponding "furrows" which run parallel to each other and in a direction at right angles to the long axis of the tooth. These horizontal lines Pickerill has termed "Imbrication Lines." On some teeth these imbrication lines are visible to the naked eye. In all teeth the ridges are widest and the furrows deepest at a point two-thirds between the neck and the occlusal surface or cutting edge; from this point they gradually diminish in size upwards and downwards. At the neck of the tooth they are much more numerous in a given space, but are very much finer and less marked. They extend towards the occlusal surface in an unworn tooth and do not diminish much in size, but they do greatly in frequency. They also disappear from this situation when the tooth has been subject to mastication. But with the soft diet of today not sufficient friction is obtained to polish the enamel surface of the teeth, therefore we have to resort to artificial methods.

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*Given as a Clinic at the Michigan State Dental Society, 1916.

We can readily see how inviting to the lodgment of food particles is the normal enamel surface, which I have just described. Thus carbo-hydrate food lodging around the necks of the teeth and the interproximal spaces is a source of acid and attacks the lime salts of the enamel, dissolving the interprismatic cement substance. The enamel being destroyed or weakened, the solution of the lime salts of the dentin is brought about in a similar manner, the organisms penetrating along the dentinal tubules.

Further stages of caries of dentin occur by another set of organisms which secrete a proteolytic enzyne. This dissolves the collegen of the dentinal matrix, *thus forming a cavity*.

Later the pulp is infected, and in the final stages alveolar abscess develops, which if not treated becomes a chronic source of infection. If treated it brings us face to face with one of our gravest operations—root-canal work.

Therefore, the most rational method of eliminating these sources of sepsis and septic absorption is to take means to prevent the commencement of the carious process at the enamel surface. This can best be accomplished by obtaining a smooth, highly polished surface, which is to a certain extent self cleansing. This surface is obtained without reducing the enamel surface to any appreciable extent, but by giving a more perfect contour to the tooth.

I have here a number of teeth which I have worked on by various methods and using different preparations. These first six models, which I will pass around, I have polished the enamel surface with the hand polishers, using the basswood stick and the orangewood point and the corresponding points for the port-polishers. I always use soaked sticks, having them first boiled for two hours and then kept in an antiseptic soap solution. A wet stick is more pliable, it can be adapted to the contour of the teeth more readily, and there is less danger of injuring the gum and surrounding soft tissues. On these six models I have spent from thirty minutes to one hour polishing the enamel surface of each tooth. They show the surface we get with this method and the various polishing powders. But when we stop to consider that most mouths have from 25 to 32 teeth it does not seem like a very practical procedure to spend an hour to a tooth. Therefore, these surfaces would represent the condition we would find in a mouth under treatment for four or five years, if this method were used.

But if we can get the same surface or one equally as good in four or five treatments, our patients will have the benefit of these results much sooner. I will show you starting with Model No. 7, the surface I obtained using a different method and different substance, which I believe is much better. This enamel surface was polished with fine "6m" carborundum powder mixed with glycerine and water to form a paste, applied with the "Young" polishers on the engine BS and D. There are other Young polishers, A, B, and C, which should not be used as they are too large and might injure the gums. The cup shaped one BS, is very flexible and will spread out following the contour of the tooth, and with skill can be used under the free margin of the gum without injury to the peridental membranes or surrounding tissues, producing a better surface in less time than by the hard polishers.

Don't confuse these with the old-fashioned rubber cups and brush wheels that were used, often lacerating the gums.

The fine carborundum powder I use to obtain the initial surface which usually takes four or five treatments, depending on the condition of the teeth. After this surface is obtained, I use silex and Merck's oxid of tin for the regular monthly treatments.

A beautiful lustre can be produced by drying the teeth with a dental napkin and applying the oxid of tin on a small dry felt wheel on the engine.

The interproximal surfaces are polished with carborundum flour and glycerine on floss tape, working it up and down between the contact point and free margin of the gum.

Where it is necessary and there is sufficient space to permit, fine cuttlefish strips can be used, being careful never to desroy the contact point. After the initial surface is obtained on the interproximal surface the silex on the floss tape is used, followed with tin oxid or the carmi-lustro tape which you can tear to any desired width.

I have here a patient to whom I have given four treatments in the last four days, using the method which I have just described. Have any of you seen any method whereby you can treat the enamel in four subsequent treatments and have the gums in as perfect a normal condition as this? And this patient is no exception, which demonstrates that this more efficient method can be used without injury to the gums or peridental membrane.

SUSCEPTIBILITY TO AND IMMUNITY FROM CARIES*

BY EARL BROOKS, D.D.S., NOBLESVILLE, IND.

A REVIEW of the literature concerning the theory of caries dates back for many generations and even centuries. The views and theories even only a generation ago, were very vague and devoid of scientific data and proof; but, in the last ten or fifteen years, there have been various learned investigators who have taken up the subject from a scientific viewpoint, and probably more advance has been made since then in the understanding of the true conditions than in all previous investigations. Various theories were advanced in former times by different investigators; but in recent times, most investigators are agreed upon the fundamental principles of caries.

With a little application on the part of the student, an understanding of the theory is by no means difficult, but we in practice too often fall into the rut of being mere machines in the performance of the daily routine of our office, not giving any time to the study of the sciencific side of our work. Just here I cannot refrain from quoting the following sentence from Dr. Black: "The complete divorcement of dental practice from studies of the pathology of dental caries, which has existed in the past, is an anomaly in science that should not continue."

After considering the results obtained by various investigators, I will try in my own way to give you my understanding of the theory of caries.

Caries begins with the dissolving of the inorganic parts of the tooth structure by an acid, and subsequently followed by decomposition of the organic parts. In decay of the enamel, the dissolution of the inorganic salts is the predominating influence; but when the dentin is reached, while the inorganic dissolution precedes the organic, they are of equal importance.

The mouth harbors a great number of various micro-organisms; yet there are found only a few, possibly a dozen varieties, that are constant in all mouths, and probably some of them are not important. The acid of caries may not be produced by any of these varieties alone, but by any one or several of them. They are constant in the mouths of both susceptibles and immunes. They also produce but little more acid in susceptibles than they do in immunes. These organisms generally, but not necessarily, perform their work under plaques which are little understood. These plaques seem to be a gelatinous substance formed by the micro-organisms themselves in their action upon the food taken into the mouth, or by a precipitation of some of the ingredients of the saliva or mucus, and their sole function is to act as protection to the micro-organisms in preventing their displacement by friction, or dilution and neutralization by the saliva of the acids they form. Thus, the acid is held in constant contact with the enamel surface until the calcium salts are dissolved. All plaques on the teeth are not alike; some do not seem to harbor decay micro-organisms, or, at least, decay does not progress in some mouths where the teeth are literally covered with a gelatinous covering.

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*Read before the Indiana State Dental Association, May, 1916.

The micro-organisms of caries produce lactic acid by their action upon carbohydrates in the food. The amount of available carbohydrates thus becomes a factor in the process. Many writers and investigators have advanced the theory that the saliva contained sufficient fermentable carbohydrates to be worthy of consideration, but recent investigations do not attach any material importance to this. The main source of carbohydrates available for fermentation is the food remaining on the teeth and other parts of the mouth after eating. The quality of the food, then, is an important factor in the process. Those eating little or no carbohydrates are free from decay, which is clinically true of meat-eating tribes.

A more important factor than this is the amount of available food left on the teeth, after eating. This may be influenced by various conditions of the teeth; such as their regularity and their perfectness which enable the possessor to chew his food properly, thereby rendering it more soluble, and thus mechanically cleanse the teeth. It may also depend upon the thoroughness of the cleansing of the mouth after eating. This, therefore, indicates that the saliva is an important factor. Some salivas are viscous and ropy. Where this form of saliva exists, it is very difficult to keep the teeth clean, because it retains the food, and such conditions are favorable to gelatinous plaques.

The acidity or alkalinity of the saliva or mouth fluids as a whole is worthy of consideration, but should not be over-estimated. The pure saliva is normally slightly alkaline, while the reaction of the mucus is normally acid, and quite often so much so that the mouth fluid, as a whole, is slightly acid. However, the acidity of the secretions of the mouth, unless excessive, bears no material relation to caries. Nor does alkalinity bear much relation to the neutralizing effect upon the acid formed by micro-organisms, inasmuch as they have their film or plaque protection them. This phase of the subject is much over-estimated. We have immunity and susceptibility in both acid and alkaline salivas.

This indicates that the character of the saliva favoring the formation of plaques is worthy of consideration.

One of the most important constituents of the saliva is ptyalin. Its relation to immunity and susceptibility is differently interpreted by various investigators. Some contend that, by its converting starches into sugars, they are readily washed away, thus reducing the possibility of fermentation. Others contend that it forms lactic acid, thus becoming the direct cause of caries. This latter theory is, however, disputed by most investigators. The greater the quantity of ptyalin, the quicker the conversion of starches to sugars, which being soluble, are more readily washed away, leaving less to ferment. The process of converting starch to sugar is somewhat complicated, but it is of such importance that a brief explanation is necessary.

A starch granule consists of a wall of cellulose and its contents of granulose. When the starch is cooked, the granulose swells and bursts the cellulose wall, the whole mass becoming a paste known as gelatinous starch which is insoluble. The ptyalin first converts this into a soluble starch, then into dextrins and maltose.

The physical qualities of dextrin is sticky, which likely aids in forming plaques. The maltose is readily soluble and easily washed away, especially by the thinner salivas. The thinner salivas are also more active in that they more readily digest the starches and render them easily washed away. The maltose is not washed away, and is easily fermented by the micro-organisms.

We are all familiar with patients who never use any prophylactic measures, but whose saliva seems to literally dissolve all the food around the teeth shortly after eating.

Again, we have all noted cases where the mouth was always apparently clean without the patients' making any special pretense at cleansing their teeth. Yet they were susceptible to caries, which fact seems to contradict the assertion that, when the saliva contains the digestive enzymes in sufficient quantities to dissolve the food that remains in the mouth after a meal, the teeth are free from fermentable materials and are immune to decay.

Again, we recall many mouths displaying gelatinous material in great quantities all over the teeth. This gelatinous material is certainly rich in organic matter and is, without doubt, an ideal culture media for all forms of micro-organisms; but in spite of it all, mouths in such condition have been found to be comparatively free from caries.

These various conditions lead us to believe that there is yet some control other than any we have reviewed, which renders the mouth immune even in the presence of rich, fermentable substance, and susceptible even in the presence of a good digestive saliva.

The saliva contains some organic principle, supposedly sulphocyanates, in varying quantities. This is demonstrated by a red reaction obtained by adding ferric chlorid to the saliva. This has been suspected by many investigators to be the immunizing principle that renders the mouth immune to caries under all conditions, even though it is rich in culture media. So enthusiastic are some investigators along this line, that they prescribe a sulphocyanate in cases where the saliva does not contain any. However, many competent investigators, after thorough investigation, dispute the potency of the principle. The chemical tests to determine the presence of these organic constituents are somewhat difficult to understand, unless one is quite well acquainted with the technic of organic laboratory practice. I shall not discuss the experiments here, but suffice it to say that the theory which declares the cyanates responsible for immunity is very questionable.

In the study of susceptibility and immunity to body disease, we are naturally confronted with the study of the sozins which are the defensive proteids occurring in the body. They destroy the bacteria themselves or counteract the toxins which they form, thus causing inmunity, and, in case of the absence of these sozins, the body becomes susceptible to the disease. It has been advocated at various times that the saliva or mucus of the mouth might contain such sozins that are predominating factors in the control of caries. There has been but little investigation about this theory and not much data for what has been done and the trend of opinion does not seem to give much credit to the theory. At least, we know that in the mouths of susceptibles and immunes, there are found constantly a dozen or more varieties of micro-organisms which might belie the theory of there being any mycosozins to destroy the bacteria themselves. We also note that there are well-defined plaques in the mouths of both immunes and susceptibles that would be a protecting factor against toxosozins in their effort to neutralize the toxins formed by the bacteria. Yet it is well known that susceptible periods follow pretty closely the stress periods of life, and it is very reasonable to suppose that, during stress periods, there would be a diminution of sozins. This factor, if it is a factor, is at least good food for thought and further investigation.

Thus far we have considered the factors that lie wholly outside of the tooth itself as being the determining factors in the theory of decay. But the physical character of the tooth itself should be considered as a factor.

About twenty years ago Dr. Black published the results of his studies on hardness and softness of teeth in both susceptibles and immunes. He found that there was but a slight difference in the amount of calcium salts in so-called hard and soft teeth, and that hardness and softness, as a determining factor of caries, was a wrong theory. He concludes the study with the following remark: "The causes of immunity and susceptibility to dental caries would necessarily be found in conditions of the general system, influencing the qualities of the mixed fluids of the mouth by which the teeth are surrounded." In his recent book, "Pathology of the Hard Tissues of the Teeth," he republishes and sustains the results of these studies. This lends support to the theory just discussed on the presence of sozins in the mouth fluids as being the determining factor of caries.

The probability of there being a difference of the porosity of the surface of the enamel is supported by quite a few investigators. However, the theory that the calcium contents of the mouth fluids is the factor causing a change in the enamel surface is the more likely. This change may be coincident or directly related to stress periods of life.

The calcium determination in the saliva as worked out by members of the Research Commission of the National Dental association shows that, in cases of immunity, the calcium content of the saliva is distinctly higher than in the susceptibles. In the examination of maternity hospital patients who were in a stress period of life, the results were variable; but, as a whole, much less than the results from a similar number of patients of the same age but not in the same period. They also noted in these patients that as the pregnancy advanced the calcium content of the saliva decreased.

Another experiment that this Commission performed to show the effect which a high calcium saliva has on the changes in the enamel surface is interesting in this connection. Following is a brief review: Teeth were sectioned. One-half was kept as control while the other was subjected to a high calcium saliva, which was frequently changed each day for thirty days; at the end of that time, all the teeth were subjected to a ten per cent. silver nitrate solution in a reduced atmospheric pressure. The specimens were then subjected to direct sunlight and microscopic sections made. It was found that the silver nitrate had penetrated much deeper in the controls than in those subjected to the high calcium saliva.

In view of the above data and experiments, it would seem quite probable that during periods of immunity, the saliva is high in calcium contents which would render the enamel surface more compact, thus increasing its acid resistance and reducing the clinging qualities of the plaques; and *vice versa* during periods of susceptibility.

After considering the various conditions entering into the theory of decay, I am led to the conclusion that there is no single condition which determines susceptibility and immunity in dental caries.

While not within the scope of this paper, still we should discuss briefly the formation of the cavity. The initial lesion of a cavity in the crown of a tooth always begins on the enamel surface. The micro-organisms grow upon the surface, where they form the acid which dissolves the cementing substance and rods of the enamel, the former dissolving faster. The micro-organisms never enter the structure until a portion of the enamel rods fall out. The lactic acid attacks the calcium salts, forming calcium lactate. This dissolution precedes the falling out of the tooth structure and operates according to the laws of osmosis in the deeper layers. This falling out of the tooth structure always precedes the entrance of micro-organisms. In caries of dentin, the same agencies operate in the same manner as they do in the enamel. As soon as micro-organisms enter the dentin they operate within the dentinal tubules. They secure their sugar by osmosis, forming lactic acid, which, in turn, forms the double salt, calcium lactate, which finds its way out by osmosis. The organic matrix of the dentin finally is digested by the enzymes of the facultative anærobic micro-organisms operating within the matrix, using it as a culture media. This whole process, however, may stop at any stage of the cavity formation, if a period of immunity arise in the individual, and later start again, if a period of susceptibility arises.

DISCUSSION

W. R. MEEKER, Peru: I want to compliment Dr. Brooks on his excellent paper and to thank him for bringing to our attention some of the things which we should understand more fully but which to the most of us are practically unknown.

In looking over this paper the first thought brought to my mind was that caries has been treated more as a mechanical condition to be dealt with, than as the result of a chemical action to be controlled.

When I replied to Dr. Carr, telling him that I would discuss Dr. Brook's paper on "Susceptibility to and Immunity from Caries," I had no idea what direction the Doctor would take; and this is only one illustration of the second clause of his paper where the essayist quotes Dr. Black in making a plea that we do not divorce our dental practice from the study of the pathology of dental caries. How often our patients come to us for relief and we see only the repair work to be done and overlook all thought of the future or that we have any responsibility with reference to their future. The doctor's paper has opened a new phase of an old subject.

In the first part of the paper only once does the essayist refer to the physical condition of the teeth as having any relation to "Susceptibility to and Immunity from Caries," and then only as the possessor may be able to chew his food properly, thereby rendering it more soluble and thus mechanically cleansing the teeth. In thus divorcing the physical condition of the teeth from all consideration of the subject I feel we overlook an explanation of many conditions ascribed to the influence of the saliva upon the teeth.

In those cases coming to my notice I have noted that in nearly, if not all cases of those immune from caries, the teeth are very nearly perfect, physically. I had a case just recently, in fact since the essayist's paper was placed in my hands, which came to me for services as the result of an accident. The man, who was past fifty years of age, informed me that it was his first visit to a dentist and that he had never owned a tooth brush. (In fact he told me he thought three-fourths of the trouble with people's teeth today came from the use of the tooth brush and the work of the dentists). In looking over this case, I found the teeth nearly perfect, the union of all developmental lobes complete, enamel very hard and very regular, showing the wear of years of service, but free from caries, one of those cases of "immunity" which if we could but reproduce would make us far more useful to humanity than the mere replacing of broken-down tooth structure.

I found it necessary to extract two of the anterior teeth, and having in mind the thought of what could produce such perfect teeth after these years of service, I decided to place one of them in a weak solution of lactic acid, along with a freshly extracted tooth from the mouth of what we would term a susceptible, and I found that the tooth from the mouth of the immune resisted the action of the acid far more than the tooth from the mouth of the susceptible. I cannot recall seeing a case where this immunity exists that the teeth were defective, and while we do see apparently perfect teeth that are very susceptible to caries, those cases where immunity does exist are found in mouths with very good teeth.

Dr. Black in his work on Dental Caries, while maintaining that "physical imperfections are in no wise a cause of dental caries," states "they give greater opportunity for the active agents of caries to do their work."

In speaking of the plaques under which the ferments work and by which they are protected the essayist says: "They are little understood." This seems to be the last word of all investigators, not only as regards the plaques but as regards the whole chemical composition of the saliva. It is a well-known fact that saliva varies both as to the amount and to the alkalinity .The sight of a lemon being squeezed will produce an abundant flow of saliva of a much stronger alkalinity than common. Pain produces an abundant flow of saliva, but it is mostly water and of a very low alkalinity. It has been said that the beginning and ending of each meal with an acid fruit will increase the alkalinity of the saliva. In the later years of Dr. Miller's life, he remarked that although he could explain how dental caries occurred, he could not explain why.

The plaque theory is credited by most investigators, but there are those who differ, calling attention to the fact that free lactic acid will destroy the bacteria that produces fermentation, and that it would be necessary that all acid be at once neutralized at the expense of the inorganic portion of the tooth structure, calcium lactate being formed to permit a continuation of the fermentation. Marshall calls attention to the fact that these plaques occur on all surfaces of the teeth and not alone on the mesio and distal surfaces, which are most liable to attack by caries, and that the saliva which almost immediately permeates all food upon mastication contains countless millions of organisms capable of transforming carbohydrates into acid; that bacteria plaques upon the teeth are not an essential factor is the cause of decay but that the lodgment and infection of carbohydrate material is the essential factor and that any circumstance which favors the lodgment of carbohydrates favors the development of caries.

In speaking of the amount of available carbohydrates becoming a factor in the process of decay the essayist states: "Those eating little or no carbohydrates are free from decay, which is true of meat-eating tribes."While this is in the main, no doubt, the cause of the immunity, we may look for a part of it to the physical condition of the teeth, the method of the preparation of the food and to the method of eating it, all of which tend to mechanically cleanse the teeth, thereby making them less susceptible to caries.

The action of the saliva on the teeth is as yet a closed book. That it does have the ability in certain cases to make teeth immune from caries seems proven beyond a doubt, but just how and why we have not been told.

Dr. Head in reporting some of his experiements called attention several years ago, to the fact that he had reproduced the hardness of enamel that had been destroyed by the action of weak lactic acid, by immersing the weakened tooth in saliva (living saliva as he called it). He called attention to the fact that 1 to 1000 lactic acid and water at mouth temperature would cut tooth enamel in thirty minutes to a rough white surface, while a 1 to 500 lactic acid solution and some saliva would not affect it.

The report of the Research Commission of the National Dental association on hardening of enamel by the action of certain salivas on it, as reported by the essayist, is a verification of the results attained by Dr. Head several years ago, when he subjected a tooth to a weak lactic acid solution until it could be cut with a lancet; then by immersing it in living saliva he could bring it back to its original hardness.

That Dr. Head's investigations were carried on very accurately may be realized from the sensitiveness of the machine he used, he being able to tell to 1-600,000 of an inch the depth of a punch of a certain size entering the enamel under pressure. In speaking of the changes that occur to enamel of a tooth, under changed conditions, he said: "I cannot explain how these changes occur, because I do not know. I am simply in a maze of astonishment."

To me the cause and progress of decay are influenced by a large variety of factors; the character and number of organisms present, the amount of carbohydrate material available for acid production, the amount of alkalinity of the saliva, the resistance of the enamel, both as to structural strength and arrangement of the teeth.

No doubt with the present research work that is being done on this subject, we will, in the near future, be told whether caries is of local or systematic origin.

A Good Coating For Plaster Casts

To four ounces of sulphuric ether add two ounces of collodion and two ounces of silver glass. The latter may be obtained from dealers in painters' supplies, and is put in 1-oz. packets. Let the mixture stand for about 48 hours, and shake well before using. Apply with a camel's-hair brush, and keep in well-corked bottle.—*Pacific Dental Gazette.*

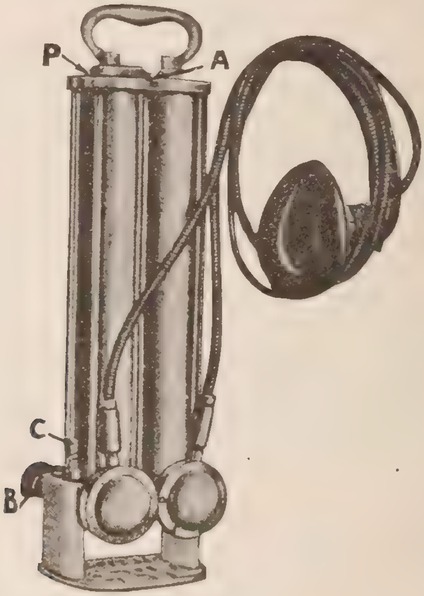
Somebody said man was made to mourn. He was not—he was made to work out his life and in the work get as much pleasure out of each twenty-four hours as he has capacity to digest. No matter what job you undertake, if you can't work up a new layer of enthusiasm each day on it, get out; you can't succeed if you can't enthuse.—*Henry D. Wilson.*

DEMONSTRATION OF THE LUNGMOTOR*

BY JAMES M. BOOHER, M.D., CHICAGO, ILL.

THIS IS the lungmotor, a device used to resuscitate persons overcome by gas poisoning, electric shock, drowning, collapse on the operating table, asphyxia, neonatorum (new born), etc.

It consists of a duplex cylinder pump, so arranged that the air in the fresh-air cylinder never comes in contact with the air in the foul-air cylinder, not even in the face mask. There is no possible way by which the foul air can mix with the fresh air. This insures the patient's always getting fresh air.



THE LUNGMOTOR

This illustrates how by notches on one of the pistons you can, by pulling a catch (*a*), set the pointer (*p*) to work on any sized subject. Connect your hospital oxygen tank to the tube (*c*), turn the mixing valve (*b*), and you can give patient any proportion of oxygen, or air and oxygen, desired.

Because persons of different ages and sizes breathe different volumes of air and have different lung capacities, this device is arranged to give a definite volume of air to every subject, from the new-born infant to the largest adult by being provided with movable adjusting pin that is positively definite in its action. On the inner circle is marked the age and size of the subjects; on the middle circle is marked the number of strokes required per minute; the outer circle the number of cubic inches put into the lungs at each stroke of the handle.

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*Given as a descriptive clinic, Ohio State Dental Society, Dec. 1915.

You notice this little pin notches in, thus—notches to mark the volume. We have here the infant; this is the five-year old; this is the ten-year old; this is the fifteen-year old; adult average.

An adult average has a lung containing about 330 cubic inches, 100 cubic inches of this is residual air, 230 cubic inches is known as vital capacity. This 230 cubic inches is important, because it is the amount of air that all other devices, excepting the lungmotor, give. Thirty-five cubic inches is known as tidal volume. This is the amount of air that the lungmotor gives to the average adult individual, and in all cases the lungmotor gives tidal volume of air—not vital capacity. The pulmotor gives vital capacity, because it puts in all the air it can, and then takes out all the air that it can.

Experience in laboratories has taught that the tidal volume of air is the best amount to give in order to resuscitate an asphyxiated individual.

The next important thing in mechanical respiration is the force with which this air is put into the lung. We want to know that it is put in with a regulated force, which will not rupture lung tissue. In order to have a perfect resuscitating device, a certain mechanical postulate must be met. This postulate is:

Given a certain size cylinder, with a definite length of stroke, at the minimum descent of the hand, which is 123 strokes a minute, with a given size opening in the face mask, only a certain minimum pressure can be secured, which is 4.86 ounces, in the case of the largest adult. This decreases as the person decreases in height and size, until in the case of an infant, the device is giving air only at about two or three millimeters pressure.

The upward stroke of the handle of the lungmotor draws air in through the air inlet, or oxygen through the oxygen inlet, the oxygen inlet being attached to the oxygen generator, or oxygen tank, according to the way this mixing valve is set: all oxygen; all air; half and half, or any percentage desired.

As I said before, the upward stroke of the handle of the device draws fresh air or oxygen into the cylinder according to the way the mixing valve is set. The same upward stroke allows the foul air in the lung to go out into this cylinder. It does not draw it out, because the device has no suction, the air being expelled by the natural resiliency of the lung itself.

The downward stroke of the handle of the lungmotor forces the fresh air out through the tube, into the face mask and into the lung, and forces the foul air in the foul-air cylinder outside through this little opening on the side.

Now, when there is an obstruction in the trachea, this device developes a suction sufficient to remove that obstruction, due to the fact that you have limited the area from which the air is being drawn by the device.

So far, this device appears to be simply a device for putting a certain measured amount of air into the lungs and allowing the lungs to expel it; but it is more than this.

The lungmotor puts more air into the lung than it takes out, up to a point where the natural resiliency of the lungs, which is seven millimeters, becomes operative. Now, this is very important because the machine working in this manner fills the lung full of air. It readily will be seen that with the lung full of air removing thirty-five cubic inches each time, you cannot get a direct pull on the lung-tissue with this device. You also readily can see that air being at this time expelled through the foul-air cylinder in volume of thirty-five cubic inches measurement, you could never get an over-dis-distended lung, because you are only putting in thirty-five cubic inches, and the natural resiliency of the lung will remove thirty-five cubic inches after you have the lung once full.

In order to explain what this means in resuscitation, I am going to take electric shock as an example, because in electric shock you have the most extreme condition of the collapse of the lung within the normal diameters of the thoracic cavity that you will find in any condition of asphyxia.

In electric shock, the right side of the heart is filled with blood under pressure, sometimes sufficient pressure to rupture the right side of the heart itself. The lungs are collapsed within the normal diameters of the thoracic cavity. The little arterioles through which the blood passes through the lung in order that it may become aerated are normally very much crooked upon themselves. When the lung collapses, they become more crooked upon themselves, to such an extent that they form a certain amount of obstruction to the flow of blood through the lung from the right to the left side of the heart.

When we fill the lung full of air with this device and keep it full, we straighten out those little arterioles, so that the obstruction is removed and the blood may be passed over from the right to the left side of the heart.

Now, there is always some blood on the left side of the heart, but not as much as normally. The fact of our bringing a normal amount of blood over to the left side of the heart acts as a stimulus to the left side of the heart, giving the left side of the heart something to contract upon.

If your man is not yet dead, and you secure a contraction of the heart, you will force blood into the aorta and into the coronary arteries, which are the first arteries leading off from the aorta. These coronary arteries carry the blood to the heart muscles, supplying the heart muscles with nutrition and the nerve ganglia of the heart with nutrition.

In other words, they are giving the heart muscles something to do so that it can work.

This raising of blood pressure in the coronary arteries is one of the principle essentials, in order that resuscitation of the heart may be secured. As an example of this, if I tried the coronary arteries with a ligature, the heart would immediately start to fibrillate, that is, pulsate, irregularly. If I removed the ligature and allowed the blood again to flow through the coronary arteries to the heart muscles, this fibrillation would cease; this experiment proving that the raising of coronary blood pressure is necessary in order to cause a fibrillating heart to cease fibrillating, and to contract normally.

The same contraction of the heart which forces blood into the aorta and coronary arteries will force blood through the carotid arteries to the brain centers, causing them to recover from their anemia.

This device does still more; it maintains the statics of the chest; that is, it maintains normal pressures in the thoracic cavity. In the thoracic cavity, there is normally a negative pressure of about thirty millimeters which increases inspirations from five to seven millimeters.

Now, ordinarily, if I take an ordinary laboratory apparatus and force air into the lungs until the lungs are full, and then take all the air out again, I am increasing positive pressure in the thoracic cavity—never negative pressure. But, when I measure my air, as you do in the lungmotor, until the lungs are full (in optimu) and depend upon the natural resiliency of the lung to expel this air, I will increase negative pressure, due to the natural resiliency of the lung always having a tendency to pull air from the chest wall.

This negative pressure operates toward drawing blood from the abdomen, or spanchnic area into the right side of the heart. This is due to the fact that this negative pressure operates more on the right side of the heart than it does on the left side of the heart, because the walls on the right side of the heart are thinner and this increase of negative pressure tends to aid the right side of the heart to dilate, thereby, of course, making the area larger and drawing blood from the vena cava to the right side of the heart, relieving the abdominal viscera of their over supply of blood, or the blood which has collected in them.

Now, this device will do that which no other method of resuscitation will do. It will give an air supply that will maintain life. It will give the normal air supply—just the amount of air that you naturally would breathe in life. It will maintain the statics of the chest—the normal pressures in the thoracic cavity—it will secure suction action of the thorax on the heart and great vessels and will aid in re-establishing circulation.

As an example:

With the manual methods, either Schaefer or Silvester, the maximum amount of air exchange which can be secured in apnoe is 200 cc. Apnoe is a condition which most resembles unconsciousness. If I take one of you gentlemen and lay you down on the table and let you breathe vary rapidly and very deeply eight or ten times, you will cease to have the desire to breathe. If I apply either the Schaefer or Silvester method of artificial respiration to you at that time, the amount of air which I can get in and out of your lungs is only 200 cc., which is not enough to maintain life, being only about one-third of the amount of air breathed naturally. But, if I apply the lungmotor, I will get, at each stroke of the handle, 750 cc. of air, which is more than sufficient to maintain life.

Now, in using either the Schaefer or Silvester method you may fracture a rib; you may break an arm. The man may be so badly injured, due to falls, that his arms are already broken, or his ribs are already broken. Then you cannot apply the manual methods—either the Schaefer or Silvester.

If there is a case of collapse on the operating table and there are abdominal wounds, you cannot turn the man over and give him the Schaefer method.

If the man on the operating table has a broken arm, you cannot give him the Silvester method of artificial respiration.

None of these methods of artificial respiration, excepting the lungmotor, will aid in re-establishing the circulation, nor will they give a normal amount of air exchange.

None of them will remove water and mucus from the trachea and mouth, in case of drowning, but the lungmotor will, because when the trachea is obstructed, the device will draw the water and mucus out of the mouth and trachea.

Some of the advantages of the lungmotor are:

It does not weigh much—the model that we put out to sell to electric companies and hospitals, weighs only eighteen and one-half pounds, base and all. It can be put on the repair wagon and does not take up much room, and is immediately available at the scene of accident.

It will always give air. It is the only device that can always give air. If you have oxygen with it, it will always give oxygen at any percentage you desire. The other devices will give only from twenty-seven to thirty-three and one-third per cent. oxygen. The lungmotor never runs out of motive power; with the other devices when you run out of oxygen, you run out of motive power.

This device, having no suction, absolutely cannot rupture lung tissue, while the other devices all rupture lung tissue, this causing the lung to collapse, interfering with the circulation. This repeated pull is sufficient to rupture the lung, or cause stelectasis; that is, the air cells glue themselves together and there is not sufficient pressure to open them up again.

With this device, if you are using oxygen, you do not have to send your tanks to a charging station to be recharged. You can get your oxygen in compact form, by parcel post, and it is always ready. It does not deteriorate.

Ages of Carelessness.—Every one knows that few individuals between the ages of 30 and 60 take any constructive forethought for their physical welfare; few carry out any definite plans for regular daily exercise or proper breathing of fresh air. Fewer still have even a fair conception of their own physical make-up or their condition at any particular time; this fact is due likely both to lack of time and to reluctance to face the truth.—C. H. Forsyth.

MICROBES AND DENTISTS

(Concluded from page 869 October Summary.)

BY F. E. STEWART, PH. G., M. D., PHAR. D., PHILADELPHIA, PA.

NATURAL LINES OF DEFENSE AGAINST INFECTION

Nature has prepared certain lines of defense against bacterial invasion which should be understood and guarded to prevent infection.

First Line of Defense. The first line of defense is the mechanism of the skin and mucous membranes. The skin is provided with a layer of epithelial cells, more or less dry and horny, which is constantly exfoliating, carrying with it the bacteria which find lodgment on the surface. The glands of the skin secrete aqueous (sweat) and oily (sebum) secretions, which, flowing outward, hinder microbes from obtaining a foothold. The mucous membranes are also provided with exfoliating epithelium and secrete mucus which entangles microbes and carries them off, often aided by hair-like *cilia* which keep the secretions in constant outward motion.

Microbes, like other foreign substances, irritate the mucous membranes by contact and greatly augment their secretions, flooding the membranes and carrying off the microbes. Sneezing and coughing aid the respiratory passages in getting rid of microbes.

Second Line of Defense. The second line of defense pertains to the body cells and their destructive enzymes, also to the blood and lymph. When microbes succeed in penetrating the first line of defense and commence to grow and multiply in the tissues, the tissue cells at the point of invasion are stimulated to produce specific proteolytic enzymes or digestive ferments for their destruction Leucocytes in enormous numbers are rushed to the infected area (leucocytosis) to aid the tissue cells in their fight against the invaders.

Inflammation and Fever . The phenomenon of inflammation is now considered to be a reactionary effort of defense against bacterial invasion. The area of invasion is generally local, and the defensive effort against it is generally successful When the bacteria multiply in the blood stream itself we have septicemia, in which the phenomena of inflammation are scattered over various areas or are absent altogether This is commonly a fatal condition; but there are few septicemias which are not secondary to a primary local infection

It has been pointed out that a rise in temperature which habitually attends acute inflammation is a factor in the line of defense, and that a raised body temperature is inimical to pathogenic bacteria, attenuating their harmful properties This may explain the fact that some good results follow large doses of bacterial vaccines—doses sufficient to give a marked reaction—where smaller doses have failed.

Antigens and Antibodies (Amboceptors) and Complement. The formation of so-called antibodies in the blood serum of an individual subjected to an attack of invading bacteria is part of the second line of defense. As already stated, Metchnikoff claims that the power of the blood and other body juices of dissolving and destroying bacteria and other foreign digestible substances is imparted to it by the phagocytes. The breaking down of the phagocytes (phagolysis) sets their enzymes free which are thus discharged into the body fluids, imparting to them the same power possessed by the phagocytes themselves.

Enzymes are produced by the body cells (including leucocytes) when bacteria penetrate the first line of defense or when they are introduced into the body artificially for immunizing purposes. Practically any protein substance may serve as an antigen and cause the production of a digestive enzyme. The digestive ferment produced by the body cells in response to stimulation by the antigen is *specific.* In other words, it will only digest the particular kind of protein introduced into the body and no other kind. For instance, if egg albumen is used as an antigen, the body cells are stimulated to produce a specific digestive ferment capable of digesting egg albumen, but not capable of digesting any other kind of protein substance. The same applies to serum albumin and globulin, milk casein, epithelial cells, vegetable albumin, etc. It also applies to bacterial protein. Each kind of bacterium requires a specific digestive ferment or enzyme for its digestion.

When a small quantity of serum from an animal, previously injected with an antigen consisting of a certain microbe (bacterium, for example) is added to a suspension of its corresponding microbe, the organism becomes agglutinated into clumps, and motility (motion) is suspended or destroyed. Such serum may not only cause agglutination, but when added to the filtrate of a culture of the corresponding microbe, may produce a cloudiness, and afterwards a precipitate. It is therefore assumed that these several actions are due to certain principles developed in the blood of the animal during the process of parenteral digestion, to which the name "*antibodies*" has been given. The bactericidal and lysogenic action is assumed to be due to the presence of bacteriolysin. Some authorities believe that the body fluids also include *bactericidin*, which has the power of killing bacteria without dissolving them. The opsonic action is assumed to be due to the presence of *opsonins.* Agglutination and precipitation are assumed to be due to the presence of *agglutinins* and *precipitans.* Vaughan believes the phenomena produced by the so-called antibodies are attributes of the digestive ferments or enzymes already described.

Amboceptor and Complement. The relation between antibodies and antigens is dependent upon the presence of complement—a constituent of normal blood serum. The various antibodies play the part of connecting links between complement and antigen, and are therefore classed under the general term "amboceptor". The term "amboceptor" implies a two-armed substance. One of the arms is connected with the antigen, the other with the complement. Until this union is completed, complement cannot act upon antigen.

Complement, which is normally present in the blood serum of all animals and man, is spoken of under various names, such as *complement* (Ehrlich), *alexin* or *cytase* (French authors). It is relatively unstable, being rapidly destroyed at 60 C. It is not specific; it is not increased to any marked extent by the process of parenteral digestion. Its function is to dissolve, agglutinate, precipitate or otherwise act upon antigens, according to the nature of the specific amboceptor present.

THE ARTIFICIAL PRODUCTION OF IMMUNITY FOR THE PREVENTION AND CURE OF INFECTIOUS DISEASES

Smallpox Vaccine. The fascinating study of the production of immunity against poisons and diseases dates back to remote times. Centuries before the Christian era the chinese observed the immunity against a second attack enjoyed by those who had survived smallpox. By inoculation, i. e., artificial transfer of the smallpox virus, they endeavored to check the spread of the disease. The inoculation was carried out by placing smallpox scabs in the nose, rubbing into the skin, etc., and, strange to say, its entrance in this manner did seem to almost invariably result in a mild case of smallpox, recovery from which left the patient immune. The practice was also later extensively employed in Europe, but after a time it became evident that, while the immunity was secured in the inoculated person, the disease thus induced could be spread as rapidly as in the natural form. Indeed, it is thought that the severity of some of the widespread and fatal epidemics was greatly enhanced by this procedure.

The first really scientific step in the production of artificial immunity against smallpox may be accredited to Edward Jenner, an English physician (born in 1749, and died in 1823), who, in 1789, announced that immunity to smallpox could be produced by vaccination.

The peasantry in various parts of the world, particularly in England, believed that sores on the hands of persons who milked cows affected by cowpox conferred immunity from the disease. It is said that in Dorsetshire, an English farmer, Benjamin Jesty, successfully vaccinated his wife and two sons as early as 1774, from a cow-pock on himself. In 1791 Plett, a Holstein schoolmaster, vaccinated three children, in one case on the finger tips, which caused inflammation of the arm and deterred him from repeating the experiment. These three children escaped the epidemic in 1794.

Jenner, while a student, learned of the traditions on this subject and mentioned them to his preceptor, John Hunter. He settled the question in 1796, when he vaccinated a boy, James Phipps, with matter from a kinepock on the hand of a dairy maid, Sarah Nelnes, and on July first introduced into this boy infectious matter from a smallpox pustule without effect. Two years later, in June, 1798, he published "An Inquiry into the Causes and

Effects of the Variolæ Vaccine", illustrated by four plates, and within a year or two vaccination became general over the continent of Europe.

In May, 1800, vaccination was adopted in the English Army, and shortly afterward in the Navy; and in July of the same year a declaration was signed by many of the medical men in London expressing their confidence in its practice.

Vaccination was introduced in the United States July 8, 1811. Benjamin Waterhouse, "Professor of Physick", Harvard University, vaccinated his own children, and John Coxe, of Philadelphia, vaccinated his oldest child about the same time, and then tested the experiment by exposing him to the influence of smallpox. The reliance on the protective power of vaccination in America was strengthened materially by this bold act. President Jefferson was instrumental in introducing vaccination in the Southern United States.

Immense Benefit Conferred upon Humanity by Vaccination. The immense benefit conferred upon humanity by vaccination may be estimated from the following facts and statistics:

In the early part of the nineteenth century, when smallpox, which at first assumed form in Europe about 1700, had become a veritable scourge, it suddenly began to decline, and this decline continued for decade after decade until the disease lost its terrors and the great majority of physicians had never so much as even seen a case. How this was almost miraculous to be accounted for? There can be but one reply to this query: the introduction of protective vaccination by Jenner and its general adoption has controlled and practically eradicated smallpox.

Thanks to the work of Pasteur in discovering the microbic causes of disease and the nature of disease germs, attention was called to the danger of contamination from this source, and the production of vaccine virus was placed on a scientific basis and is now under government supervision. In the production of vaccine, as carried on by modern laboratories, absolute safety is insured.

BACTERIAL VACCINES

Bacterins. The term "bacterial vaccine" was applied to this class of products by Wright because they are used for producing immunity against pathogenic bacteria similar to the immunity against smallpox produced by the use of bovine vaccines. But the name "bacterin" has been proposed as more appropriate than "vaccine", because the latter term refers more properly to Jennerian vaccination. In this paper I have used the term "bacterin" as synonymous with "bacterial vaccine", with the distinct understanding on my part that this name is free to science and commerce and is not controlled by any manufacturing house. The name first appeared in Cohen's "System of Physiologic Therapeutics," Vol. XI, 1905.

Bacterins (or bacterial vaccines, as they are termed by Wright and his followers) are killed pathogenic bacteria suspended in sterile physiological saline solution protected by antiseptics from contamination, and standardized to contain a definite number of bacteria in each c. c. Bacterins, like other vaccines, are modified disease viruses, so modified that they are no longer capable of growing and multiplying in the body, but not so modified as to destroy their power as antigens; consequently, when they are introduced into the body, they stimulate the body cells to produce the specific amboceptors, opsonins, enzymes or antibodies, which have the power of destroying the invading micro-organisms. The body cells having acquired the power of producing these antibacterial substances by means of this artificial stimulation are in a condition to promptly produce such antibacterial substances, when the individual is re-exposed to the same infection and therefore has acquired immunity of longer or shorter duration.

Autogenous versus Stock Vaccines. Bacterins are prepared either from germs cultured in the laboratory, or directly from germs isolated from the patient. In the first case they are called *stock* bacterins, and in the latter autogenous *bacterins.* The question of stock bacterins versus autogenous bacterins is one concerning which there has always been much dispute. Some physicians claiming to be authorities, insist that autogenous bacterins should always be employed. Wright and his followers largely employ stock bacterins, and use autogenous bacterins only when stock bacterins fail, or when for any special reason autogenous bacterins are to be preferred. Stock bacterins are used exclusively in immunizing against typhoid fever, and owing to their power of stimulating the body cells to produce specific antibodies against typhoid bacillus, their employment has practically banished typhoid fever from the armies of the world. If autogenous bacterins are essential to success, it logically follows that diphtheria antitoxin, tetanus antitoxin and antibacterial serums are useless because they are stock preparations. It is well known that the contrary is the fact.

The fact is, that stock bacterins, especially if polyvalent, are as efficacious in many instances as are the autogenous bacterins. Reference to the writings of Cole and Meakins, Hamilton, Cooke, Hartwell and Lee, and other well known authorities, may be cited in support of this statement. Furthermore, polyvalent stock bacterins are infinitely to be preferred to autogenous bacterins as often prepared by persons not thoroughly trained in bacteriological technic.

Polyvalency. It is now considered that many of the early failures with stock vaccines were due to the use of a bacterin composed of but one variety of a certain species of bacterin. Bacterins, as now manufactured, are polyvalent; that is, they are composed of as many varieties of a given bacterial species as possible. The use of polyvalent bacterins has been attended with such success that the manufacturers are now producing almost exclusively stock bacterins and serums.

Negative and Positive Phases. Immediately after the injection of a bacterin there follows a period in which there is a decrease in the amount of opsonins in the blood of the patient due to their being used up by the killed bacteria injected. This decrease is known as the "opsonic negative phase", and is followed by an increase in opsonins known as the "positive phase". The negative phase will not be manifested clinically unless a sufficient dose is given to produce more than a physiological effect. In that case the negative phase is manifested by malaise, increased temperature and aggravation of the symptoms. This statement is in accordance with that of Wright, who says: "If a proper dose of vaccine has been injected no clinical symptoms should be produced even during the opsonic negative phase." Leary makes the same statement in other words in a paper read before the Rhode Island Medical Society, in which he says: "The ideal immunizing response can be produced without the toxic negative phase. Physiological doses of vaccine should be followed by an immediate production of antibodies without toxic action". The same authority also states that in chronic diseases, except in tuberculosis, the injection of vaccine in considerable doses is followed by a temporary lowering of the patient's resistance, a frankly negative phase, which may exist for some time, during which period a further use of vaccine is not desirable and may be harmful. In acute conditions, when bacterins are used in proper doses, the negative phase is either ephemeral or absent.

ANTITOXINS AND ANTIBACTERIAL SERUMS

When bacteria grow and multiply in the body, symptoms of posioning (toxemia) are manifested, consequently it was inferred that bacteria either produce poisons during their growth or contain poisons. Subsequent experiments proved that the poisonous effects of a few bacteria are traceable to substances elaborated during the growth of the bacteria which pass out into the surrounding media, and the poisonous effects of the other class seemed to be due to the actual constituents of the bacterial cell. To the former the name exotoxins or extracellular toxins was given. The latter were named *endotoxins* or *intracellular* toxins.

Antitoxins. The injection of soluble toxins into the body stimulates the tissue cells to produce "antitoxins". These toxins when injected without the bacteria do not give rise to antibacterial substances.

Among the bacteria-producing soluble extracelluler toxins or exotoxins, the bacillus of diphtheria and the bacillus of tetanus are the most important. Serum from an animal immunized by injecting into its body small and increasing doses of toxin, administered at regular intervals and given over a long period (months) of time, is rich in antitoxin. This serum when properly prepared, concentrated and standardized, constitutes the antitoxin of commerce. Diphtheria antitoxin and tetanus antitoxin are prepared in a similar manner. When these antitoxins are introduced into the bodies of other animals or man, they become temporarily immune to the toxin produced by the living organisms. Consequently these antitoxins are used for immunizing healthy persons against diphtheria and tetanus, as well as for their treatment.

SOME INFECTIOUS DISEASES IN WHICH BACTERINS AND SERUMS ARE SPECIALLY INDICATED

Pyorrhea Alveolaris. This disease is associated with mixed infections in which the endamebæ buccalis (a protozoan) and the so-called mouth infection are etiological factors. Our knowledge of the protozoa in their relation to pyorrhea alveolaris is largely due to the work of Barrett and Smith of Philadelphia, and Bass and Johns of New Orleans. The Philadelphia workers were unacquainted with the work carried on in New Orleans which adds to the value of the investigations on account of their independent origin. To Dr. Claude P. Brown, working in the Mulford Laboratories, in cooperation with Dr. A. P. Hitchens, we are indebted for one of the most important contributions to the knowledge of bacteriology of pyorrhea alveolaris. The material for the bacteriological examination was collected by Dr. Joseph Head, of Philadelphia, from pyorrheal pockets in the mouths of patients under his treatment for the disease. The results obtained by Brown from the study of cultures from pyorrheal pockets in forty-eight cases, both as to technic and cultural methods followed, are carefully described and tabulated in his paper entitled "The Bacteriology of Pyorrhea Alveolaris", published in the *New York Medical Journal*, December 20, 1913.

As already stated, he found six kinds of bacteria universally and continually present, namely: Bacillus influenza, streptococcus, staphylococcus, pneumococcus, Micrococcus catarrhalis, and the diphtheroid bacilli. Reference to his findings was made on page 864 of the October DENTAL SUMMARY, where will also be found a summary of the investigations of Goadby, Cummins, Rosenberger and others.

In the treatment of pyorrhea alveolaris resource was had to the use of emetine as a specific against the endameba buccalis. This amebicide, which has been so successfully employed by Rogers and others in the treatment of amebic dysentery, is recommended for the destruction of the ameba in pyorrhea alveolaris by Barrett and Smith, and also by Bass and Johns. Barrett and Smith treated locally thirteen cases by injecting into the pockets of infection between the teeth and the gums one-half of one per cent. of emetine hydrochloride. In several of these thirteen cases, the pus disappeared completely to gross inspection in twenty-four hours after application. This result was attained in all the cases after three daily local treatments. It is only where there is a wider distribution of the parasites, as in the tonsils, or where systemic complications exist that the hypodermic use of the drug is considered advisable by these investigators. Bass and Johns, on the contrary, are strong advocates of the hypodermic use of emetine. They find one-half to a grain, up to three grains of emetine given hypodermically is sufficient. According to these investigators the endamebæ disappeared from the lesions following from one to three days of hypodermic treatment in more than ninety per cent. of all the cases. They disappeared in ninety-nine per cent. following six days of treatment. They state that all cases should be treated at least three days and none more than six. Usually one-half a grain daily for three to six days, depending upon the case and the stage of the disease, is all that is required to accomplish the purpose.

For local application higher concentrations than one-half of one per cent. of the emetine hydrochloride is likely to provoke inflammatory reactions at the gums. Care should also be taken to use a neutral solution of the salt, as free hydrochloric acid is apt to be irritant to the gums and adjacent surfaces; the solution should also be isotonic with the blood, for it may prove irritating if used either in stronger or weaker solutions.

The solution is introduced into the pyorrhea pockets with an ordinary hypodermic syringe with a straight or special curved dental needle, as needed, so as to gain access to all parts of the pockets. Dr Barrett particularly calls attention to the way of using the needle. The point should be rounded as it may pass along the root of the tooth to the bottom of the pocket, merely engaging with the wall, and be carried to all of its parts without penetrating the inner walls of the pocket of infection. Each pocket in turn is filled with the emetine hydrochloride solution, and Barrett believes it to be good practice to apply the solution also to parts which, according to gross examination, are not involved—as into the interdental spaces and around fixed appliances. "Treatments which thus include all recognizable pockets, and especially parts under suspicion, should be repeated daily for at least five days, and thereafter every other day until about ten treatments as a total have been made, as a general rule." He also recommends that "microscopic examination of scrapings from the pockets should be made from time to time for persisting endamebæ as the treatment progresses, and this, together with the general appearance of the lesions, will determine the appropriate duration of treatment. In some of the less marked and less chronic cases, a total of five or six applications or even less may be sufficient, while in the more stubborn instances treatment must be continued even longer than above indicated.

Every unhealed lesion must be regarded as a source of reinfection which will certainly promptly occur just as long as endamebæ are being constantly thrown off from the pockets of infection.

"Coincident with the disappearance of the endamebæ, the soreness, pain, or discomfort, and the amount of pus formed, rapidly decreases. The tendency to bleed from slight trauma usually ceases within forty-eight hours, and in almost all cases the patient recognizes and feels confident of the beneficial effects within a few days."

Bass recommends a solution of one-half of one per cent. for the treatment of the pockets of infection. Vedder found that emetine kills the endamebæ when diluted one hundred thousand times, and Bass recommends its dilution with alcohol about ten times, and that one drop of this should be applied to a wet toothbrush and be used for washing the teeth; or two or three drops of the fluid extract may be added to half a glass of water and the mouth thoroughly rinsed with it at night before retiring. He also states that the endamebæ contained in the pockets are destroyed by injecting one-half of one per cent. emetine hydrochloride solution into the pockets with a hypodermic syringe.

In the treatment of pyorrhea alveolaris the objects are first to destroy infecting micro-organisms; second, to get rid of the pockets of infection and prevent reinfection; and third, to restore the tissues to a normal condition as far as possible; fourth, to meet the indications arising from systemic infection.

The Use of Ammonium Biflouride. Dr. Joseph Head, of Philadelphia, uses ammonium biflouride in twenty per cent. solution (containing ten per cent. free acid) as an amebicide and bactericide. He also finds this solution an excellent solvent for the softening of tartar.

It is commonly believed that the accumulation of tartar aids in separating the gums from the teeth, and in the production of pockets of infection. To what extent the tartar accumulation is an etiological factor in pyorrhea is possibly an open question. However, there can be no question that it should be removed by the dentist. Head says that the ammonium biflouride solution not only destroys the infection and softens the tartar so that it may be readily removed by the scalers, but stimulates the tissue cells so that they form reattachment of the gum to the root, thus causing the disappearance of the pockets of infection, and getting rid of the self-perpetuating foci of infection. After four or five applications one week apart, black scales that have escaped the instrument will sometimes be found floating loose in the pockets of infection so that they can be readily picked out, and finally the root will become as soft as velvet to the touch of the instrument.

Head says that when this stage has been reached it will be found that the scalers cannot be carried as deeply into the pyorrhea pockets as in the beginning. To do so causes pain and a free flow of blood. This indicates that new granulations are forming, and these should not be ruthlessly broken up either by instrumentation or by the injection of the biflouride into them. If at the end of two or three months treatment any of the pockets of infection have not entirely healed, they should be re-explored with scalers and the treatment repeated as for a new case. Teeth that have lost more than half of their gum attachment under this treatment have become firm and comfortable to the action of normal mastication.

Bacterin Treatment. It is doubtless true that in many cases of pyorrhea alveolaris the elimination of the original offenders, aided by proper operative procedures, will enable the tissues to overcome the invading micro-organisms present and once more to establish normal relations. The use of amebicides and bactericides aided by proper operative procedures cannot be depended upon, however, to cure all cases of pyorrhea alveolaris and to prevent re-infection. The bacterial infection remains to be considered. This infection may have become systemic, as already stated, indicating the use of systemic treatment. The systemic condition may in certain cases be overcome by the use of bacterins. The objects of the bacterin treatment are to aid nature in eliminating disease-producing bacteria from the tissues after they have become established, and also to prevent disease-producing germs from gaining a foothold in the body.

A bacterin for the treatment of pyorrhea alveolaris should contain all the organisms isolated in the given case. Therefore, theoretically an autogenous vaccine should be employed. However, practically a polyvalent stock vaccine will often be found perfectly satisfactory, and thus save the patient the expense and time of an autogenous vaccine.

When the almost universal presence of pyorrhea alveolaris is taken into consideration, and the danger of systemic infection is taken into account it becomes at once apparent that the medical and dental professions should, cooperate in their efforts to get rid of the septic mouth and its sequelæ. A septic condition of the mouth may continue for many years without causing any notable systemic infection, but there is always a liability of an extension of the infection to the tonsils from which it is believed the invading organisms may find their way into the blood and be carried to other parts of the body to establish local foci. An important paper relating to tonsilar infection was presented to the Philadelphia Pathogenic Society in the early part of October, 1914, by Smith, Middleton and Barrett, and published in the journal of the A. M. A. November, 1914. In this paper the authors announced their discovery of the ameba in the tonsils observed in cases of hypertrophic tonsilitis previously observed by Barrett and Smith in infected mouth tissues. Emphasis was given in this paper to the probable relationship between amebic infection occurring in the mouth and tonsils with various systemic complications such as arthritis, obscure anemics and gastrointestinal diseases.

E. C. Rosenow has demonstrated the connection between septic tonsils and so-called infectious rheumatism, endocarditis and ulcer of the stomach. Other authorities have pointed out the connection between tonsilitis and appendicitis, and have also proved beyond doubt the connection of various diseases of the viscera content in the abdomen and pelvis with localized foci occurring in the tonsils and the appendix or elsewhere.

These findings give to the dental profession added dignity and importance and make it all the more necessary to include in the dental curriculum a more general knowledge of pathology, bacteriology and general therapeusis.

Attention has been called to the fact that the septic mouth may contain staphylococcus, streptococcus, pneumococcus, influenza bacillus and the diphtheroid group, any one or more of which may be pathogenic. Further study of the subject demonstrates the fact that the same micro-organisms may be found in the nasal passages and sinuses, and that pathological conditions may result from their presence if any one or more of them become parasites.

The limits of this paper will not permit of an extended reference to the infectious diseases amenable to bacterins and serum treatment. However, when it is considered that abscesses, boils, carbuncles and sycosis, seborrhea, acne, eczema, endocarditis, pleurisy, peritonitis, meningitis, typhoid fever, tuberculosis, diphtheria, cholera, plague and other infectious diseases are either being prevented or successfully treated by the use of these products, their importance as prophylactic and therapeutic agents can hardly be over estimated.

THE INFLUENCE OF DIETETIC AND MEDICINAL MEASURES UPON THE CALCIUM METABOLISM OF RACHITIC CHILDREN.*

BY H. J. GERSTENBERGER, M.D., CLEVELAND, OHIO

WHEN THE SECRETARY OF YOUR COMMITTEE first asked me to address you at this meeting, I hesitated to accept because I did not, at that moment, know whether I could speak to you on a subject that would be of real interest to you. While considering this matter two thoughts came to my mind, the first, that you, as a profession, are interested in preventive measures, and the second, that your first and main work is devoted to the teeth. I know that the teeth are mainly composed of calcium and that they need for their proper development an adequate amount of this mineral substance. A disease whose main characteristic is a broken down calcium metabolism is rickets, and so I felt that this subject both from a therapeutic and especially from a preventive view-point might be of interest to you.

At the present moment rickets is considered to be one of the so-called constitutional nutritional diseases. In all probability, it affects the entire body, but shows its most characteristic symptoms in the skeleton, that part of the human body which is most markedly dependent upon calcium for its own normal development. These symptoms are mainly characterized by a softening, a lack of hardening, a lack of calcification. They may appear in different parts of the bony system. In some children the symptoms are limited to the head, in others to the chest, in still others to the extremities, and in some they are found in every part of the bony system. This localization of the symptoms of rickets to different parts of the skeleton is determined by the intensity of growth present in the different parts of the bony system when the infant is having its rickets; in other words, that part of the skeleton which is needing the calcium more than other parts is the one which will show the most marked signs of rickets. If the rickets starts before or immediately after birth and continues throughout the first eighteen months of extrauterine life, the entire skeleton of the child will show symptoms of this disease. Czerny, however, believes that in addition to the just mentioned factor another hereditary one is concerned in the localization of these symptoms. The former, however, would seem to me to be far more important than the latter. A further presentation of the general symptomotology of rickets is not necessary for the purpose of this paper. It will suffice to state briefly the symptoms referable to the teeth.

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*Read before the Northern Ohio Dental Society, 1916.

Both the temporary and the permanent teeth are affected by rickets. According to Gundobin, the incisors of the temporary set can be affected by rickets, from the sixteenth fetal week to the fifth month postpartum. The first permanent molars from the sixth fetal month to the eighteenth month of extauterine life, and the permanent incisors from the first month postpartum to the fourth year. In 84 per cent. of the cases, according to Gundobin, the incisors are mainly affected. The most common symptom caused by rickets in the process of dentition is a delayed, asymmetric and irregular eruption of the teeth. We find further that the teeth are small, soft, discolored, and broken easily. In severe cases the softening process amputates the tooth at the gum. According to Pfaundler, the temporary teeth show the lesions of rickets mainly at the neck of the tooth and at the root, while the permanent teeth show upon the cutting surfaces and the crowns the so-called erosions. Syphilis and tuberculosis have been blamed for these changes in the teeth. It is, however, doubtful according to Lesage, whether they play any direct part in the production of the symptoms just mentioned. He seems to feel that if a child with syphilis or tuberculosis has no nutritional disturbance and is well nourished that its teeth will be just as sound as those of any other child. It is of course plausible that lues and tuberculosis can augment the deleterious effects of rickets in a child that is nutritionally disturbed, as each rachitic child is. At any rate there is no question in any of the authors' minds that the symptoms stated are due in practially all of the cases to rickets.

Now what do we know about the etiology, the metabolism, the chemistry, and the pathogenesis of rickets? Regarding the first there exists at the present time only hypothesis. The following have been advanced as etiological factors in the development of rickets: acute and chronic nutritional disturbances, insufficient light, poor ventilation and lack of exercise—usually included under the term of domestication—infections, climatic factors and different foods. American and English authors especially blame foods that are high in carbo-hydrates, like the ordinary patent foods, while the German authors find cow's milk as the most important food factor. A fact which stands out above all others in etiological consideration, is the one that rickets is much more frequent in the artificially-fed infants and children than in those fed at their mother's breast. This is especially interesting as the amount of calcium offered in mother's milk is decidedly less than that offered in cow's milk. This originally led Stoeltzner to believe that calcium was the toxic agent responsible for the development of rickets and spasmophilia.

This contention, however, has been disproven by other authors. As a matter of fact we now know that large doses of a calcium salt, especially in conjunction with cod liver oil,can remedy the calcium loss which is so constant in rickets. Later on in the paper I shall again return to this question of etiology.

Two methods have been followed in determining the amount of calcium required by the young infant and child; the one followed mainly by Aaron and Schabad was based upon complete mineral analyses of rachitic bodies, and the other followed by Orgler, who reached his conclusions by striking an average of a large number of mineral metabolism results obtained from a large series of normal cases. Aaron and Schabad found that each kilogram of body weight has a calcium oxid content of 12 gms., and they, therefore, concluded that the need of the infant for 100 gms. of increase in weight was 1.2 gms. of calcium oxid, or 0.25 gms. of calcium oxid for every 20 gms. of increase in weight. If the increase in weight were constantly uniform in the various organic and inorganic substances added to the body, this method and the suggestions drawn from it might be considered adequate. However, we know that on some days the weight is increased mainly through the addition of water and on other days through the addition of fats. Of course, the amount of mineral substances required will not be the same under these varying conditions. Therefore, it seems as if the method followed by Orgler would be closer to the true state of affairs. He found that the average amount of calcium oxid retained within 24 hours by the average normal infant was 0.174 gms. If we figure that 25 to 30 per cent. of the calcium intake is not utilized by the body, then the daily need of the average infant will equal about 0.23 gms. of calcium oxid. All of the customary modifications and dilutions of cow's milk contain more than the just-mentioned amount of calcium oxid. According to Langstein, the lowest content of calcium oxid found in human milk was 0.27 gms. per liter. This data would seem to prove that all milk, that is, human and cow's milk, contains a sufficient amount of calcium oxid to meet the needs of the infant. It is, however, another question whether the body of the rachitic infant is able to utilize the calcium present in the food given it. Metabolic studies of rachitic infants and chemical analyses made upon different parts of the bony systems of such individuals give the uniform result of a lessened retention or increased output of calcium oxid by the body. In other words, they prove that the body of the rachitic infant for some reason or other, is not able to utilize the calcium that is present in the food offered it, and they also explain the clinical picture observed in rickets. Some of the rachitic infants examined for their mineral metabolism have shown a negative balance in calcium. These cases, of course, are conclusive. Others have shown a retention below normal, and still others apparently have a normal retention. From the work of Birk, Orgler, and Schloss we now know, however, that this is due to the stage of the rickets at the time at which the metabolism experiment is carried out. Long before we see clinical symptoms the calcium metabolism may be disturbed, and also long before the clinical symptoms begin to disappear the calcium metabolism may have improved. Therefore, it is necessary for carrying out calcium metabolism experiments in rachitic children to follow Schloss's suggestion, namely, to get the infants early, that is, somewhere around the third month of life. The following figures by Schabad prove that the bone of the rachitic infant contains decidedly less calcium than the bone of the normal infant. A rib from the latter contains:

14 to 32% Water	21 to 25% Calcium Oxid
40 to 46% Ash	12 to 18% P^2O^5

whereas the rib from a rachitic infant contains:

42 to 66% Water	4 to 16% C^aO^2
7 to 32% Ash	3 to 12% P^2O^5

Pathologic-anatomical investigations give the same net result, namely, that the newly-formed bony tissue in rachitic children remains uncalcified.

At the present time the pathogenesis of rickets is just as dark as its etiology. Regarding the manner by which the calcification process is hampered, we have many hypothesis, but mainly three: first, a primary deficiency of calcium in the food given; second, a disturbance existing in the body outside of the osseous system which hinders the assimilation of calcium—this is called a secondary calcium deficiency—and third, a pathological change by which the bone-forming tissue is hindered in binding the calcium for its *ossification* process.

As stated before, no analyses of human milk have been reported showing a deficiency in the calcium content, and all customary dilutions and modifications of cow's milk surely contain adequate amounts of calcium. Of course, when infants are fed for a long time with cereal decoctions, oatmeal water, barley water, rice water, and the like, or with patent foods, to which very small amounts of milk have been added, they are, of course, then getting a food which is deficient in calcium. Whether the pathological pictures found in the bones of these rachitic children are the same as those obtained from rachitic children that have developed their rickets while being fed with cow's milk or not, I do not know. Pathologists who have been working on this subject in animals and who have produced clinical rickets while feeding foods with a low calcium content claim that the pathological picture of the bones of these animals is different from that found in our regular cases of rickets. They, therefore, believe that the two conditions are not the same but simply similar. It is a recognized clinical fact however, that most of our premature infants, even with the best of hygienic care and with breast milk, show some signs of rickets. Now it is known that the calcium is deposited in the foetus during the last months of pregnancy, and therefore, when the infant is born prematurely, it comes to extrauterine life with a supply of calcium below that possessed by the normal full-term child. It is, therefore, easy to imagine that under these conditions the amount of calcium present in the breast milk is not sufficient to meet its needs. This observation seems to me to be of great importance and of extreme value, for it shows that the amount of calcium needed in the food of the infant is a relative affair. Those infants who are born with a large supply of calcium in their body can get along, if needs be, with a food that has a low content of this mineral, while others born with a smaller supply of calcium will need at least a normal food as far as the calcium content is concerned. The most important factors concerned in the production of the secondary deficiency of calcium are the mild, chronic nutritional disturbances of the infant, the so-called malnutrition of the American and English authors, or the "disturbed balance" of Finkelstein. Metabolism experiments carried out especially by the German schools prove conclusively that there is a decided calcium loss in these conditions. It is further a well-recognized clinical fact that many of these children show signs of rickets; in other words, that the two conditions are very often associated in the same child. Practically all of the infants showing these clinical pictures have been fed with cow's milk, diluted or modifiied in some form or other. Birk and Rothenberg's experiments lead then to believe that the fat in the cow's milk is the offending party. They found, namely, that when they fed their infant skimmed milk with sugar and water a positive balance in calcium was obtained; whereas, when this skimmed milk was replaced by whole milk the positive balance was changed to a negative one.

The children ill with the nutritional disturbance just mentioned usually have constipated, fatty soap stools; that is, stools whose fat content, in a much higher per cent. than is normal, is present in the form of calcium and magnesium soaps which are insoluble. It was at first thought that this abnormal binding of the calcium was responsible for this loss in retention. However, calculations made by various authors seem to prove that the amount lost in this manner is not sufficient to explain the degree of decrease in the retention of calcium. For these reasons the third hypothesis mentioned above is the one that is considered to be most plausible by most authors. Pfaundler imagines that at a certain stage of the development of the cartilage there exists in it a substance which enables it to have a special affinity for calcium. He, therefore, feels that there is a disturbance of this physiological function. He has found some evidence to substantiate this hypothesis in the observation that pseudo-rachitic bones do not bind nearly as many calcium ions as the truly rachitic do. Lehnerdt added strontium phosphate to a calcium low diet and found that a bone tissue was formed which very much resembled true rachitic tissue. More of this abnormal tissue was formed in this experiment than was justified by the amount of calcium offered in the food. This was a different result than that obtained in experiments in which a deficiency of food calcium alone was established. However, the osseous tissue produced in the strontium animals differed from that found in true rickets in having a great avidity for calcium. As soon as calcium was added to the diet the strontium tissue utilized it, whereas the truly rachitic tissue did not.

Funk, who has especially called our attention to substances contained in the food which he has named vitamines, believes that rickets may be due to a deficiency of some vitamine. He comes to this conclusion because of the fact that cod liver oil is so efficacious in the treatment of rickets. This clinical observation was first made by Kassowitz, who claimed that cod liver oil, especially in conjunction with phosphorus, was nearly a specific for rickets. Schloss, who during the past years has done enormous amount of experimental work on infants ill with rickets, found that cod liver oil improved conditions, especially when administered together with some calcium salt. Schabad believed that calcium acetate was the most efficacious, whereas Schloss now has proven that tricalcium phosphate is the best. He has reported cases which have been improved by the sole administration of this salt, and the clinical experience of the last few years has also proven that spasmophilic diathesis, a condition most frequently found in rachitic infants, can be clinically cured by the administration of large doses of a calcium salt. We further know that the clinical picture which we find in spasmophilia can also be produced by the removal of the parathyroid glands in human beings and animals. The removal of these bodies is followed by a marked outpouring of calcium salts, and this observation gives impetus to the view that spasmophilia has to do with deficiency of parathyroid glands. Of course, this does not explain how a non-surgical deficiency in the function of the parathyroid glands might be brought about, nor does it mean that a deficiency of the parathyroid gland is the sole cause of spasmophilia. This observation, together with the clinical fact that cod liver oil does so much to improve clinical rickets, adds much to the hypothesis that possibly rickets, too, is at least partly due to a deficiency in the function of some gland of internal secretion.

Now, what dietetic and medicinal means have we at our disposal to remedy the faulty calcium metabolism of the rachitic infant? From clinical studies we know that the reduction of the cow's milk and the replacing of the calories lost in this manner by the additon of vegetables to the diet of the infant, bring results. The metabolism observation made by Birk and Rothenberg, as quoted above, gives absolute proof that the removal of the fat does influence the calcium metabolism in the sense of improvement. This is also evidently unconsciously proven by some very interesting work reported recently by Schloss. His reports show me that those foods which contain a high per cent. of the cow's milk fat produced a more marked reduction in the retention of calcium than those which had a lower per cent. Especially is the retention better in a food which has in addition to the lower per cent. of cow's milk fat a higher per cent. of calcium present in the form of an organic combination with casein. In Schloss' diets no vegetables were added and, therefore, the additon of these substances cannot be given the credit for the improved condition. Schabad, a number of years ago, proved by metabolism experiments that the clinical observation of the beneficial effects of the administration of cod liver oil to rachitic infants was true. His findings have been substantiated and exemplified by Schloss in his recent work, which proves that the administration of cod liver oil enhances the retention of calcium, and further that cod liver oil, together with calcium, does the same thing to an even a greater degree. Schloss gives the latter in the form of a ten per cent. emulsion and adds it to the daily food of the infant.

The remarkable outstanding point in all that I have stated so far is to me the following: children on breast milk, which has a very high per cent. of fat, rarely have rickets, and children on cow's milk, which ordinarily is given with a lower per cent. of fat, very commonly have rickets; reduction of cow's milk fat improves rickets and the giving of breast milk with its high fat content often does the same.

I think an observation which I was able to make during the past winter in connection with some work which I was doing in the preparation of an artificial food adapted to human breast milk, and which considered especially qualitative characteristics of the fats in the food made, throws some light upon this question. I observed that infants fed with this artificial food, called S. M. A.—synthetic milk adapted to human milk—which contains practically the same amount of protein, salts, sugar and fat as are contained in breast milk, and which is similar to it in physical characteristics, and whose fats have no greater amount of the low volatile fatty acids than breast milk fat has, in other words, much less than that contained in cow's milk fat, showed no clinical signs of rickets, and that one of the infants who, upon another food, had developed a marked case of rickets improved decidedly by simply being transferred to the S. M. A. The same good therapeutic result was obtained with this food in cases of spasmophilia.

This artificial food, however, contains a small amount of cod liver oil and, therefore, it may be claimed that the beneficial results are entirely due to the cod liver oil. That the cod liver oil does play a part, there can hardly be any question, from the clinical and experimental evidence presented by other authors. However, I feel that the experimental metabolism work which I have planned will bear out my contention that a very important factor, if not the most important factor in the production of rickets and spasmophilia, is a relatively high volatile fatty acid content of milk fat, and especially therefore, of cow's milk fat, and that for these reasons, a food like the one just mentioned will be a big step in advance towards the prevention, or at least towards the lessening and limiting of the development of rickets in infants who are artificially fed.

My own hypothesis regarding the pathogenesis of rickets would be that there are two factors concerned, first, an absolute or relative primary or secondary calcium deficiency, either in the body or in the food or in both, and second, an absolute or relative primary or secondary disturbance in some gland of internal secretion which controls or governs or aids the calcium metabolism. Whether the relatively high or low volatile fatty acid content of food fat plays a primary or secondary role in the establishment of either one or both of these two factors, I do not know. I imagine that it might do both. Future work will have to determine this question. If it is answered in the affirmative, the means at our disposal will be great.

In conclusion, however, I would say that at the present time we can influence by dietetic and medicinal means the calcium metabolism of rachitic infants in the sense of improvement. The dietetic measures at our disposal are first, a food with a sufficient calcium content; and secondly, a food with a low cow's fat content; and the medicinal measures first, cod liver oil, second, a calcium salt, preferably tricalcium phosphate; and third, the combination of cod liver oil with tricalcium phosphate. These means, however, should not be used simply to cure rickets but mainly and especially to prevent rickets. Therefore, I believe that it is a wise plan to give every artificially-fed infant, especially during the first six months of its life, either cod liver oil alone or cod liver oil with tricalcium phosphate.

DISCUSSION

Dr. J. E. Phelps, Chagrin Falls: I am sure we all share the same opinion that the society is very fortunate in having with us this evening as our guest, so distinguished a gentleman as Dr. H. J. Gerstenberger, of this city, and all of us will be benefited by his most interesting paper—especially those that were attentive listeners.

Chemistry is a science that has unfolded its riches only to those who never weary of well doing, and the field is still green to make many a youth famous. That our new home for research work on Euclid avenue may have the names of some present written there is reasonably expected.

"The Influence of Dietetics and Medicinal Measures upon the Calcium Metabolism of Rachitic Children," "Physiological Chemistry of the Human Body—The Reflection of the Chemistry of Foods." is a subject that gives much food for reflection. The theme under discussion is as old as the ages and unfortunately for us all too little understood. Matter is indestructible. It refuses to do other than exist; its three forms—solid, liquid and gaseous; its complementary agents—light, heat and electricity.

The vitality of the human body is but the force of the chemistry of food. It is a humble reflection to discover that we are removed but two steps from the earth you have in your flower pots to your form that reflects beauty in the mirror. The anatomic change is wrought by molecules of matter reproduced in cereals, fruit or vegetables, supplemented by milk or meat, perhaps, from another lower form of animal life that has developed by like form of food. Five atoms of carbon-dioxid and five atoms of water make one atom of sugar. Plant life in every form, with rare exceptions, shares in producing this food more essential to life than luxury.

Ammonia, another element forming plant-life into foods, is formed by the union of three volumes of hydrogen with one of nitrogen. Lime is another important factor in dissolving other crystaline elements and silicates and building them into vegetable structure that is available to bone and tooth development. Would the exigency of the occasion permit, there are many other combinations of the elements into food forms that are none the less interesting.

In arranging the 1916 program of this time-honored Dental Society—this the fifty-ninth annual session—your committee was impressed with the retrospect it afforded. It has had enrolled in its membership many of the most distinguished men of the profession—operatively and mechanically speaking. The triune of work, (of art,) convenience and comfort is met in the mouth of the people here in every walk of life. For a generation just passing, the science of physiology and physics has been grafted onto our duties and now the cry is coming up from thirty millions of children, from infancy to public and parochial school graduating age, asking what can we do to free ourselves from the torture of defective teeth? In 1911 members of this society were credited with framing the Constitution of the National Mouth Hygiene Association, and now there are nearly twenty millions of school youth in the country who are awakening to the benefits that may be enjoyed by personal and professional care of the teeth and associated tissue, and value of them to better their future. The past year this society had members who have made possible the foundation of a research seat of learning. It is not a local affair, but professionally speaking, national. It may be the few that traverse the dusty road of time-honored investigators who have made the development of our life from the citizen we meet in the cart pushed by the mother—which the gamin of the street refers to as a bundle of condensed milk—to the philosopher who shapes the plans of higher human destiny. By study the members of the dental profession can illuminate the minds of those they have to serve by the system of suggestive therapeutics, including the menu that contributes to building the best frame and teeth for the human body. The day is past when the art of dentistry is the limit of service that we owe to society. We trust we will see that our contributions to the temple of research is but the bread cast upon the waters, that will return to us four-fold. May the members of the Northern Ohio Dental Society reflect the pacemaker in their zeal for usefulness in dietetics. To be a good wife is an art; to be a good mother is a profession; to be a good housekeeper is a business.

Dr. W. H. Whitslar: To discuss this paper would require a great deal of research on our part, and when our essayist himself says that he is unable to determine exactly what is the best method of procedure in regard to diet, what are we going to do? I absolve myself from that responsibility as to advising mothers as to the best way to care for the child with food that will make teeth and bony structure, and I advise them frankly to consult at once one who is scientifically prepared to advise them in regard to the quality of food that should be administered to the child. I direct them to the physician who has assisted in bringing the child into the world, and who knows the temperament and the physical qualities of the mother, who knows her ability to receive into her body food that will be metabolized by her and sent out into the food for the child. The physician is the one who should give this advise, and not the dentist. I say to the mother, "Eat the best quality of food you can, abstain from those things that are not nutritious, and consult your physician."

I feel we are highly honored in the presence of Dr. Gerstenberger, who has given us the last word in the matter of dietetics and care of children along this line. We can go still farther. The physicians of the community in which we live know something of the development of the teeth, and they know that the permanent teeth begin as early as the twenty-fifth week of intrauterine life; that is, the first permanent molars which are of so much value to us in our masticatory process, and that the incisors begin their calcification at the first year of postpartem life. We can advise these physicians where they are derelict in their knowledge of the teeth, and we can go still farther and advise the authorities of the cities who have charge of the milk and food supplies of the city, to come to the absolute requirements of law in furnishing foods which are nutritious and not adulterated with materials that will tend to break down the vital forces of nature. We should work together with the physicians and help them to gain a knowledge of the anatomy and development of the jaws and teeth, and we, as a profession, are now working in corelation with the medical profession so beautifully, that our opportunity is at hand to assist them, as well as be assisted ourselves; in this great study. The dental profession is weak in this matter of dietetics, and we can learn much; therefore we are fortunate in having Dr. Gerstenberger with us tonight.

Dr. G. W. Cochran: A strong point brought out by the essayist is the fact that rachitic teeth are not always due to the syphilitic strain. I have felt for some time that all pitted teeth, such as the crowns of molor teeth and incisors, were not of syphilitic taint. I think that is one of the strongest points in the doctor's paper.

Root Canal Filling

In the deciduous teeth I use a paste of iodoform and oil of cloves, or iodoform and vaseline, with gutta-percha points, occasionally, or a paste as follows: Alum exsic, thymol, glycerol (aa 1 gram), zinc oxid (g.s. fiat paste); or xeroform 1 part, zinc oxid 15 parts, glycerine g.s., phenol g. 30.—*John E. Gurley, D.D.S., Pacific Dental Gazette.*

CORRESPONDENCE

THE CODE OF ETHICS, ADVERTISING AND FEES

BY FRANK W. SAGE, D.D.S., CINCINNATI, OHIO.

EDITOR DENTAL SUMMARY: I read with interest and pleasure Dr. H. C. Sexton's paper published in the September number of THE SUMMARY, on the subject, "Dental Orthodoxy." Not having had the privilege of hearing the paper read in convention, I am taking the privilege of discussing it in your columns.

Considering the excellence of Dr. Sexton's suggestion that the public press be subsidized—that I think is his idea—for the purpose of keeping the public informed as to the progress in research of the profession, and as to means to be employed for saving teeth, I see no occasion whatever for his apologizing at such length. If this were done under the auspices and direction of the various local dental societies, it might accomplish much in enlightening the public. As matters at present are, we find occasionally in print matter pertaining to dentistry much of which is wholly erroneous, some of it a partial expression of truth, none of it indorsed as Dr. Sexton proposes.

Yet the question comes up and will not down, *cui bono?* Have we after all, as Dr. Sexton declares, "a wonderful message to deliver to the people?" Let us review the matter in the light of recent researches.

First of all, and most significant, our research men do not agree among themselves as to various matters most important that we should be correctly informed about. Here is Dr. Pickerell advocating the use of an acid wash for the teeth, to promote a free flow of alkaline saliva, thereby neutralizing both the acid of the wash, and the lactic, butyric, and what-not acids which promote decay of teeth.

Drs. Pickerell and others, Dr. Edward C. Kirk included, agree that carbo-hydrates in the saliva are the promoters of decay, through their nourishing the specific germs of decay. Dr. Pickerell attacks the lactic acid, the result of germ ravages, while Dr. Kirk, and his colleague Dr. Michaels, of Paris, France, are engaged in researches aimed at eliminating carbohydrates excreted from the blood-stream through the salivary ducts, nourishing the germs. Meanwhile Dr. Prinz comes forward, opposing Dr. Pickerell, at least, in his theory, affirming that his suggested use of an artificially-prepared acid as a tooth-wash is calculated to do mischief, through unduly stimulating the salivary ducts. Other research men than these named are following still other lines of investigation.

In the midst of this chaotic muddle, what important message has our profession to deliver to the public?

Even in so simple a matter as the personal care of the teeth, we are not able to lay down definite rules. What has been discovered, after all, as to that? This only: that in one mouth swarming with the specific organisms of decay, a mouth wholly uncared for, the person never using a brush, never so much as rinsing the mouth with a view to cleanliness, dentists discover little or no decay. In another mouth, containing few specific organisms, carefully kept, the person all but living with a tooth-brush in hand, decay constantly recurs.

Is it any wonder that country people long ago became immovably convinced that to fuss with tooth-brushes was to invite decay? What if they did mistake the mass of evidence all around them for the sum total of all human experience, as to tooth decay? What if their children, such as little "Johnny" named by Dr. Sexton, lend a deaf ear to the school teacher's admonition to use the brush thrice daily; what message, after all, is to be brought to these children, but this: that some may neglect the tooth-brush, others not?

That is what this all appears at present to amount to. If there be one all-important message requiring to be sounded in the public ear, I should name this: the early, very early care of the children's teeth. If the family tradition and experience is against using the brush, why insist? A lady teacher is reported, in a recent dental journal, as threatening a child with a whipping in case it did not obey the mandate to use the tooth-brush thrice daily. What right had she to do this?

The all-important message, then, seems to be about this: to convey to the members of each community, that while some may with comparative impunity neglect their teeth, many need to take scrupulous care of the teeth, to have decay promptly checked if, for no other purpose, to forestall pulp complications, the necessity of extirpation of the pulps, with the consequent complications liable later to arise, through fields of infection at root apices.

In a late number of THE SUMMARY appears a discussion of a paper in which Dr. F. J. Prow enumerates eight methods of controlling sensitiveness of dentin, from cataphoresis to conductive anesthesia, all of which he declares have either fallen utterly into disuse, or are today regarded as of doubtful utility. Shall we tell the general public that, and if so to what purpose?

Something between the lines, or lurking in the body of his opening paragraphs, tempts me to suspect that Dr. Sexton started out to say something entirely different from this he has given us. I thought he was going on to say something about a dentist's advertising that he had bought a new chair, spittoon, analgesia outfit, but decided it would not be profitable to pursue that line of talk. So where he did not take the matter up, I propose to begin.

As to advertising, general, personal, any kind of advertising: Why is it proper to place one's card in a paper, announcing the place of practice, office hours, home address, etc., and improper to announce that one is prepared to do all kinds of dentistry at lowest rates? Indeed, why may not one say, if so inclined, "I have bought a new outfit, complete in all its details, with the latest approved appliances for practicing." etc.? Why may not the elderly dentist advertise thus: "I have practiced in this city forty-two years, have attended dental conventions, have written for dental journals, kept abreast of the times. Now, why are you leaving me, to go across the street and patronize that young squirt who thinks because he has just graduated, has a shiny outfit of dental furnishings, that he knows it all, and can give me cards and spades? I know by instinct, that he has already called me a back number, but consider this: with all my years of experience, don't you think I ought to know better than this youngster what to do for patients, not to mention the knowing what *not* to do," etc.?

It really is not necessary to answer this question. Indeed Dr. Sexton has already answered it. As a matter of fact it avails nothing, nothing whatever, to hoist a signal of distress of this sort. People, if they notice it at all, only laugh. They have really no "bowels and mercies" as referring to the superannuated dentist, no more than they have for his youthful rival, if, as so often happens, the latter turns out to be not such a "crack" as he vaunts himself. The code of ethics probably foresaw the chance of the old fellow's making an ass of himself, when it prescribed certain restrictions, just as it foresaw the chances of the new youngster's making an ass of himself, if given full rein. So, then, it would appear from superficial examination that the code is all right. *Only it isn't.* Dr Sexton would probably say the code needs revising. But there I go attributing to him sentiments to which he does not stand committed. Let me then speak for myself: *The code of ethics ought to be smashed:* (Confidential note: The writer of this has been forty-six years in practice, is still pegging away at teeth, has studied the practical working of the code of ethics, and thinks—it ought to be smashed.)

Dr. George Watt, first editor of this journal, once quoted someone as saying that the code of ethics was designed primarily to curb upstart beginners, and keep them from stealing the old fellows' practice; which to say the least, does not sound plausible. It presupposes that only greybeards had a hand in devising it.

The fact seems to be about thus: In the early days dentists, at least, were a rather rude set, requiring to have instilled into them a few elementary principles governing the conduct of gentlemen. If it wasn't that, what was it? But why, today, should it be deemed necessary to guard the large body of intelligent dental practitioners against the obvious folly of writing themselves up in the daily press? The public has come to understand very well that the spirit of the profession is against all this; then why take the trouble to reiterate in a code of ethics, that which is patent to all? If the code after all, be regarded as indispensable, as protecting the public against pretenders, why not amend and amplify it to discountenance such evasion of its letter while violating its spirit, as appears from an instance I cite further on in this article?

We talk about quacks as if there were none of the genus excepting in the ranks of the advertising horn-tooters. Many of these quacks, some of them certainly, are better dentists than those who plume themselves on their superiority because they read a dental journal or two, which (presumably) the quack does not. Does he not? Who can say? I saw last week a really artistic denture, which cost the lady the same as another full set made for her in a dental college laboratory. The first-mentioned denture was all any dentist could desire; the second was simply *monumental in its inadaptation to the purposes of an artificial denture.*

But this is not to encourage quacks. Personally, I do not like advertising. Equally do I dislike anyone telling me I must not advertise. I believe both illustrations above-given to be rather exceptional. You do not always get satisfactory service at the advertiser's office, nor do you always get unsatisfactory service at the college clinic. I have seen as fine gold fillings made at the dental college as any living operator could make.

But as to the code: Possibly I have been a trifle precipitate in saying it should be smashed. I will consider, at my convenience, whether to take that back or not. The code goes on to specify a number of things, such things as an outsider, a layman, would probably declare innocent enough, above reproach; the code I say, goes on to prohibit these. It begins in a number of headings, "It is unprofessional to"—and so on, and so on. How would it do to add to some of these, something like this: "It is unprofessional, when you are consulted by another dentist perhaps many years longer in practice than you have been, a graduate of the same college you graduated from, when he asks you what you would do in this case or in that case, to thrust out your chest and proceed to give him some elementary instruction in matters familiar to any college freshman, instead of the special information he asked for. In short it is unprofessional to affect to exalt yourself above your peers in practice, simply because you think you can "carry it off successfully".

Or here, for another suggestion: "It is unprofessional to exalt yourself before any individual dentist, or any body of dentists, as an original research man, when you know, and they know, and you know they know, that you have simply appropriated the results of the other fellow's profound researches, having too little special preliminary education along the special lines of scientific research to successfully investigate for yourself."

I might follow this up indefinitely, but the pages of THE SUMMARY, as I understand it, are not sufficiently elastic to accommodate all that one might say. These I admit, are somewhat ferocious thrusts, but such I meant them to be. Let us have no humbuggery as to these matters.

One more suggestion for an amendment of the code I have to offer. I would have it stamp as unprofessional any undue pluming of oneself over the younger dentist, simply because he is younger, less experienced. If it be an offense for the younger man to deride his seniors in practice, equally offensive is it for the senior to belittle and strive to humiliate the newcomer to the professional ranks.

But again as to the code. The very men who profess to esteem it as something hallowed, as we all know, often evade its spirit, while observing its letter. Here is a city physician, a man standing in the very foremost ranks of his confreres, who contributes to medical journals, is prominent in medical conventions, an enemy of empiricism in all its offensive forms. Yet he contrives to have himself interviewed rather frequently by newspaper reporters, especially at times when some alleged or actual discovery in medical science is stirring the public. The profession is in a fine frenzy over the reported discovery of the germ of infantile paralysis; many are burning midnight oil over their microscopes. On a Sunday morning appears an interview with Dr. Blank. It seems the doctor has succeeded in identifying the special germ. No other doctor in the city seems to have been so fortunate.

(Query: Who prompted that reporter to call on Dr. Blank?)

This distinguished physician has other ways of—well, of attracting not to say monopolizing—attention, the public attention. He drives an automobile of a curious, unusual design. He sits up behind his liveried, colored chauffeur, looking important. This of course is no violation of any provision of the code; a professional man may look important in his private car, but not in print. That is, to be more explicit, he may not offer his phiz in the daily or Sunday papers.

Here is another instance of Dr. Blank's advertising: He usurps a space on the sign bulletin, where the list of tenants of the office building appears, thrice as great as that occupied by any other physician in the building sheltering some seventy other doctors. Is this advertising? Probably not, because it is not expressly declared in the code that a physician must not avail himself of an adventitious advantage such as this accruing to himself, because he occupies an entire floor, instead of only a four or five-room suite, such as the others have. However, his professional associates whisper about it, so it would seem to be objectionable.

We all know dentists who make a practice of going from dental society to dental society reading papers, giving screen demonstrations, thereby make themselves subjects of rankling jealousy, only too often, in their home cities. Rival organizations, designed to show that other home fellows are of some importance too, spring up. You see, I am shameless in exposing these things. Most of you doubtless knew it all before.

Now the dentist who thus lays himself liable is probably a fine fellow; such as I have met are unquestionably men of the highest character and ability, men working for the betterment of dental conditions among all classes. Beyond question they reap a rich, practical reward, in thus going outside the usually recognized lines of professional service to enlighten the dentists, first of all, then incidentally, the public. They become elevated upon a higher plane than that familiar to the ordinary dentist. People hearing of their professional popularity, which means, often, preeminence, say to themselves, "this man must be a leader among the dentists", and naturally, correctly indeed, for the most part, infer that he is superior in his ability as well. So they go to him. Is all this advertising? Undoubtedly it is. But who for a moment would take exception to it? The code of ethics, however inefficient it may be, does not certainly require a professional man to ward off and repudiate the advantages incident to this form of advertising.

(I may be permitted to remark, in passing, that formerly this sort of thing appeared to me vain, unworthy. Today I regard the matter differently; wish I had done more of it, years ago. Do so. Make the most of this confession, you who want to do so.)

We do not today need the code of ethics. If a professional man is obnoxious to his fellows in practice, it will be henceforth unnecessary to refer to any code, to find out why. Admit all comers to our societies, expelling those who prove themselves unfit. The dentist who will crowd as close to the ethical fence as possible, seeking license to do objectionable things, would the more effectually give himself away, as the slang expression is, if there were no code. Great Britain never has had a written constitution; yet last summer they hanged an Irish Lord, adjudged guilty of treason, seeming to have no difficulty, without a constitution, in establishing the fact of treasonable action.

Years ago I went so far as to declare we needed no Board of Dental Examiners, no preliminary requirements whatsoever of applicants for admission to dental practice. As to that I have changed my mind. The fool public requires protection against unscrupulous, incompetent dentists. But the code of ethics has served its purpose. The Hon. Gerritt Smith, addressing a political convention, before our Civil War, said of our American Constitution, "It is its spirit and not its letter, which is the Constitution." So we may say of our code of ethics. It is its spirit which will survive, and which will guide all action, long after its letter has been forgotten. We all know; the public knows, that to vaunt one's professional ability in print, to show one's phiz in a newspaper advertisement, is in bad taste. If the day of this self-vaunting has not actually passed, it is at least so near its extinction as to be negligible.

Now as to fees. In every community there are some who can pay little or nothing for dental services. When practicing in a city of 13,000, I assumed that this was a distinguishing feature of small cities. But when I came to practice in a city of the first class, I found many such. We dentists must live; we cannot serve many such without a fee. It is a thing most distressing to consider. The serious feature concerning it is this; that owing ofttimes to the time and labor, not to mention expense required, in serving such without pay, we are at a great disadvantage as contrasted with the physician, in his ministrations.

Dr. Sexton pleads for a more compassionate regard for the poor who require our services, yet are unable to pay an adequate fee. He urges that we should think less of overtaking, in our mad pursuit, the Almighty Dollar, while yielding to the plaintive cry of these unfortunates. Certainly a commendable spirit in the Doctor.

Let us look into this matter a little. The discovery that dental service is required is always an unwelcome one to the patient, at all events. A sufferer with toothache presents himself at your office. You allay his pain and announce that he needs twenty-five dollars' worth of your service. Now people provide in advance for spring suits, hats, we will say even for summer trips to the sea-board or the mountains; but they have no suggestion, until a tooth aches and they come to you, of another bill of expense, one wholly unexpected. Hence the first impulse of the patient is to get some close figuring from you. He may be intending to call on his tailor with an order that very week, and so, not having unlimited means, he begins, in his secret resentment against Fate, to reduce this unwelcome item of expense to its lowest possible terms. The young lady who presents herself with an aching tooth, dressed in a new Palm Beach suit, perhaps begins to "hedge" before a word about expense is uttered by you. Her father is in the hospital; her sister is laid up at home with a felon on her finger, and has been unable to bang a typewriter for weeks. These tales abound in country districts and cities alike. Girls whose income should go to help support families dependent on father's weekly wage of eleven dollars, (see Dr. Sexton's quotations of figures), will make such pleas as the above, in advance of any intimation from you that you expect any fee whatsoever. Ofttimes, what they have in mind is not the limited family income, but the fifteen-dollar hat they have set their heart on buying next week. They've been saving up for that, not for teeth.

Now what the dentist needs to do far oftener than he actually does, is to suggest openly and boldly, shamelessly, if need be, postponing the suit proposition, or the hat prepossession, in favor of teeth. That is where we fail, whether we practice in large cities or in factory communities such as Dr. Sexton names. Suggest that the summer trip be side-tracked. So many dentists are mealy-mouthed, afraid of offending patients who in truth have little concern or delicacy as to asking unreasonable favors of them. Say boldly to such a one: "This work will cost you not less than forty dollars; I suggest that you spend the money on your teeth, letting the summer trip go. You can't do both."

(Take this—how awfully fitting some of these slang expressions are—take this, I say, from a practitioner of forty-six years' experience; no patient worth having, which means, who expects to pay his bill, will take offense at this. It is really much better to make certain people fear you than to be too complaisant. They will respect you more, *believe me.*)

In a factory community, patients being thus given to understand that the prospective bill must be paid, will ofttimes devise ways and means to that end, of which you have no conception, not knowing their resources. Little Jane, age fourteen, being given to understand that consulting you means a bill to be paid, will go out to help pick hops, or what-not, to accumulate the necessary amount to pay you.

The practitioner in a small town needs to be protected against imposition often practiced somewhat innocently on him, if I may so state the case.

People make appointments with him and then—come or not, as suits their convenience. A dentist who has "bowels and mercies," as the apostle Paul puts it, largely developed, is sure in time to find himself become a sort of unrecognized missionary in the field. Some of you may recall in my series of "Office Boy" sketches, contributed to the *Dental Digest*, years ago, one fable representing "The Boss" lamenting to his office boy, his unprofitable dental practice. He says, "James, this is the way things goes with me, of late years; people what haint got no money, what haint never had no money, what haint no prospect of ever gittin' no money, comes confidin'ly to me to git their teeth fixed." Many a dentist in a small community, not a few in cities, let me say, might make a similar confession.

An article in a recent monthly magazine, on the missionary in the foreign field, went on to say that he is usually paid rather well, I think $1,500 was the figure named for the annual salary, in Japan, with a furnished house thrown in, so that, as the writer observed, "the foreign missionary is often far better provided for than the country pastor in the United States". Certainly so. Now consider the state of the average dentist of a compassionate turn, in almost any small town or village of the United States. He does five dollars' worth for some impecunious patient, for one or two dollars. Result, patient sends an impecunious friend. Before long this dentist is enjoying all the perquisites of self denial and sacrifice that pertain to the foreign missionary, without any such ante-provision as a salary and a furnished house as pertains to the latter's condition It is not his privilege, either, to make a long ocean voyage home, every few years, to be received by the church folks, to be honored and feted as a hero. Oh, no! The dentist suffers without honor, unless it be the honor of an approving conscience. When he dies his widow does the best she can. When the missionary dies, some Board looks after his widow and children.

Dentists in small places do not employ the art of arranging in advance for an adequate fee, as often they might do. I once asked a "quack" in a small city where I formerly practiced, how it was that he enjoyed the reputation of always collecting his bills, while others of us often had to borrow money to pay expenses, having hundreds of dollars of unpaid bills? His answer was: "I long ago, from the beginning of my practicing in this city, indeed before that, while still a student, learned to use my tongue, to some purpose, before I began any operations with my fingers." He went on to explain that when a poor patient presented, instead of rushing him or her into the chair and beginning forthwith, he inquired as to ability to pay. Finding no visible funds, he would make suggestions for borrowing of some good Samaritan or other. Often this would fail; whereupon he would suggest going home, pondering the matter, calling for another talk over the matter, later. This he explained, impressed on the caller the fact that he was not working without adequate pay, and often resulted in the applicant thinking out a practicable scheme for paying.

That much I learned from a "quack", and ever since have employed the suggestion to good purpose. In any community, large or small, it won't do to cheapen yourself. Human nature is such that you must hedge yourself about, in one way or another, make yourself in a degree inaccessible. The best of people, well-meaning, generous even, will thoughtlessly incommode you unless you do this.

These problems have no concern whatever for some dentists, city men particularly. I heard a dentist say that years ago, when first he came to the city to practice, he used deliberately to raise his prices on such as presented at his office, whom he regarded as "undesirables" because of their being, in his conception, such as he would be unwilling to have his wealthy patients find him serving. This, too, according to his statement, at times when he really needed money. He was aiming to serve only the select few, (comparatively), the wealthy classes. This purpose he finally achieved.

Dr. Sexton speaks of the limited means of many residents of the city where he practices. Probably he knows as well as the writer, that cities of the first class contain a vast majority of people of limited means. His problem is not his alone. But we of the larger cities may refer our impecunious applicants to the dental colleges. He speaks of the blessing of the one-dollar amalgam filling. It is not wholly unknown in all the larger cities.

The only important advantage a dentist practicing in a large city has over the other fellows is, that he may, if he so decree, repulse all with short pocketbooks. The larger fee appertaining to a city practice, doubtless is the magnet which attracts so many to the metropolis. Numbers and still numbers who listen to the call, fail, because they are not of the right kind of timber to fit into a high-class city practice. On the other hand, many a dentist born and brought up in a city, would do better to go to a country town to practice. Or at least he would better not try for the upper class of patients, so called.

A certain dentist who enjoyed not only a national but an international reputation, years ago, went from a small inland town, hardly more than a village, to practice in a large city. He was there years before satisfying himself that as a city dentist he was a failure. Yet this dentist used to have patients coming hundreds of miles to patronize him, and that before the day of the automobile. In his home village, I mean.

An impecunious clientele does not necessarily mean a small income› in all cases. With a sufficient number of one-dollar patients, a dentist may do fairly well, provided he economizes on time. This means, requiring patients to be prompt in keeping engagements. Industry makes fair amends for small returns, and industry depends upon the patients keeping engagements. After many years of practice, I incline to charge patients for time engaged, whether failures to keep the engagement were avoidable or not. Some few get mad and quit, but what of that? The very ones who leave you, on that account, are such as telephone you, half an hour after they were due at your office, that they cannot come, being indisposed, or have unexpected company from a distance. Perhaps an hour later you see them whir by in an auto, with a lot of merry companions. Charge them for the time whether or no. It pays amply in the end. Some charge unless ample notice of inability to keep the appointment is given. But patients, who would scorn to steal a spoiled peach from a huckster's stand, will trump up an excuse to fit their requirements with you. Charge them, I say, without qualification.

Dentists in country and city alike often fail to get returns which a moment's consideration show might be got. Here comes into your office, the wife of a millionaire, a woman to whom a matter of two or three hundred dollars, more or less, signifies little. Not that she is willing to squander money, but she will spend a hundred or two more on herself, in case you demonstrate the need of so doing. She wants a full denture. You make her a rubber set, charging her say forty dollars, which is five or ten dollars more than you usually charge, and plume yourself on your management.

All wrong are you. What you should do is to make her a full gold set and charge two hundred and fifty dollars or five hundred dollars, thereby making a profit of say two hundred dollars or four hundred and fifty dollars. If you have no facilities for making gold sets, hundreds and hundreds of dental laboratories, in cities, will undertake every requirement for you, if you send on a correct model. Beyond question a gold set in many cases, is far preferable to a rubber one. What are you afraid of?

No end of opportunities for a large profit are overlooked by dentists who are not alive to their chances.

Another matter: Here comes a judge, or a prominent politician, who is in a terrible hurry to have a set repaired. Suggest to him the expediency of having a second set in readiness for just such an emergency as this. In my private practice I have made of late years, hundreds of dentures, on such a plea as the foregoing. Do not overlook these opportunities; they mean increase of income.

As to the suffering poor in a community, someone years ago said: "dentistry is a luxury; the poor have no reason to expect anything more than extraction. Fillings, even plates, are not for them."

In Europe, the ravages of decay in mouths are everywhere forced on the traveler's attention. Is it indeed such an evil to lose teeth? I who am writing this have lost all but two upper molars, back, having retained all the lower teeth and the anterior incisors and cuspids. I manage very well to masticate. No plate for a while, for me.

I find I have forgotten a few things I meant to say in their appropriate order. Forty-six years ago I rode about the country, with my dental instruments in saddle bags, soliciting from farmhouse to farmhouse. The code of ethics forbade that then, as now. But I had then had only one year in the dental college, and assumed the rule did not apply to me. I do not recall feeling any compunctions whatever. The township was sparsely settled, and the people were usually glad to have me come, and never once did I receive from a patient any inquiry touching a violation of a code. I doubt whether any of them knew there was a code. I got along very well, having at times peculiar scruples (which referred however to no code of ethics) as to re-visiting certain families.

I used to number, in those days, dental friends who never saw the inside of a dental college, never attended dental conventions, attended strictly to the business of the passing day. To one of these men I became strongly attached. He was a splendid dentist. But he did not know a thing about germs, infection through root-canals, sterilizing. He simply washed his hands carefully, and trusted in Providence—with fair success. He extracted all aching teeth, and possibly, certainly, a few that had not ached, and made well-fitting, satisfactory plates.

According to the creed of our English friend, Hunter, that was correct, commendable dentistry, better than we conservatives do today. Who knows?

The Groton, Seventh and Race Sts.

Newport, R. I.—Because they use too much water and too little soap, women do not get the same dazzling whiteness in their washed clothes as do the United States Marines, Sergeant Clarence D. Rhoades, of the Marine Corps, told a party of society women visiting the battleship Utah.

"The eye-paining brilliance of our white clothes is due to the fact that we wash with our heads as well as our hands, and we let soap do its proper share of the work. Just enough water to thoroughly wet the wash is sufficient", the sergeant continued, "and the less water and more soap one uses the whiter the washing will turn out."

The fair visitors seemed greatly impressed with the lesson given them in an art that is dear to every woman's heart.

Port Royal, S. C.—Plain, wholesome food, fresh air and regular hours caused the recruits of the Ninth Drill Company of the United States Marine Corps, in training at the recruit depot here, to gain almost seven pounds per man in weight, after fourteen weeks of instruction. This company of fifty-six men weighed, upon enlistment, 8,076 pounds and at the end of fourteen weeks training it increased to 8,467 pounds; a gain of 391 pounds.

This same company had a chest capacity, upon enlistment, of 11,906 cubic inches, and, after fourteen weeks, had increased it to 13,295 cubic inches; a gain of 1,386 cubic inches.

The physical gain of this company was 38 per cent.

SOCIETY·ANNOUNCEMENTS

Nebraska State Board

The Nebraska Board of Dental Secretaries will hold a regular meeting at Omaha, Nebraska, November 21, 22, 23, 24, for the examination of candidates.

S. A. Allen, *Secretary.*
Loup City, Nebraska.

North Carolina State Board

The next regular meeting of the North Carolina State Board of Dental Examiners will be held promptly at 9:00 o'clock on Thursday morning, January 11, 1917, at Greensboro, N. C.

For further information and application blanks, address

F. L. Hunt, *Secretary,*
Asheville, N. C.

Minnesota State

The Thirty-Fourth annual convention of the Minnesota State Dental Association will be held February 23 and 24, 1916, at the University of Minnesota, Minneapolis, Minn.

Max E. Ernst, *Secretary,*
541 Loury Bldg., St. Paul, Minn.

St. Louis Dental Society

The Sixtieth Anniversary meeting of the St. Louis Dental Society will be held at the Planters Hotel, St. Louis, November 16, 17, 18, 1916.

A program offering the latest information and rational procedure in the management of the vital problems confronting the profession at this time, will be presented by men of recognized authority on the subjects.

Dr. Weston A. Price, of the Research Institute of the National Dental Association, will lecture on "The Present Status of our Knowledge of the Relation of Mouth Infections to Systemic Disease". This will include a review of the recent researches on focal infection compared to clinical data, the processes by which organisms attack tissues, and the principles of resistance to infection, illustrated with stereopticon and motion pictures.

Dr. C. N. Johnson, in a paper on "Some of the Present Tendencies in Operative Dentistry", will discuss the efficiency of prophylaxis in preventing disease, the influence of silicates on modern practice, and the proper attitude of the dentist, the physician, and the radiographer toward focal infection associated with teeth.

Dr. Elmer S. Best, who has standardized the "Technic of Pulp Canal Surgery", will give the differential indications for sterilization and filling, apicoectomy and curetage, and extraction. He will outline the complete technic of aseptic pulp canal operations and give a clinical demonstration.

Dr. Edward T. Tinker will teach the "Technic of Bridge Abutments on Vital Teeth", showing the detail of construction and radiographic proof of the practicability of conserving pulps in bridge work.

Dr. W. E. Cummer, of Toronto, will offer a solution to the problem of supplying artificial substitutes in the semi-edentulous mouths of the martyrs to the indiscriminate extraction of pulpless teeth. Under the title of "Partial Dentures", the glorified descendant of the inefficient, unhygienic fixed bridge and "ordinary" partial denture will be described.

One afternoon will be devoted to general clinics, another to manufacturer's exhibits and clinics, and the third to group clinics by the members of the St. Louis Dental Society, with the following sections: prophylaxis, pulp operations, inlays, gold and amalgam fillings, porcelain crowns, inlays and stains, shell jacket, and dowel crowns, bar and anchor dentures, impressions and occlusion, deciduous teeth, radiodontia and oral surgery. Individual and study club clinics are solicited by the clinic committee, Dr. E. P. Dameron, DeMenil Building, St Louis, Chairman.

Registration and admission strictly by National Dental Association membership cards, and the opening session will begin at 10 A. M. November 16, without formal ceremonies.

The following hotels are conveniently located and reservations should be made in advance. Planters $1.50 to $6.00, Jefferson $1 50 to $4.00, American $1.50 to $2.50, Maryland $1.00 to $4.00.

Pennsylvania State Board

The next meeting of the Pennsylvania Board of Dental Examiners will be held in Musical Fund Hall, 808 Locust Street, Philadelphia, and at the University of Pittsburg, on Wednesday, Thursday, Friday and Saturday, December 6, 7, 8, and 9.

The practical work will be held on Wednesday, December 6, at the Philadelphia Dental College, 18th and Buttonwood Streets, Philadelphia, and University of Pittsburgh Dental Department, Pittsburgh. The operative work at 8:30 A. M., and the prosthetic at 1:30 P. M. It will be necessary for all applicants to take the examination in practical work, including those coming up for re-examination.

Blanks for the yearly registration of all dentists in Pennsylvania as required by the Act of 1915, will be mailed during October, and anyone not receiving the same, can secure them by addressing the Secretary of the Board of Dental Examiners.

Application blanks for the examination can be secured from the Department of Public Instruction, Harrisburg.

Further information, address the Secretary,

ALEXANDER H. REYNOLDS,
4630 Chester Ave., Philadelphia.

Ohio State Dental Society

The fifty-first annual meeting of the Ohio State Dental Society will be held in Dayton, December 5, 6, and 7, 1916.

Complete program will be mailed about November 15th.

Mark off the dates now and make your hotel reservations early.

F. R. Chapman, *Secretary.*

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing November 20, and continuing six days. For application blanks and full particulars address Dr. Fred J. Prow, Secretary, Bloomington, Indiana.

Michigan State Board of Dental Examiners

The next regular meeting of the Michigan State Board of Dental Examiners for the examination of applicants who may desire to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, November 13, 1916, at 8:00 A. M., and will continue through Saturday, November 18. All applications and credentials together with fees, *must be in the hands* of the Secretary at least ten days prior to the date of examination.

For application blanks and all further information, application should be made to E. O. Gillespie, *Secretary-Treasurer,*
Stephenson, Mich.

Ohio Dentists Take Notice

Ohio State Dental Society members and officers of components will please take notice that the dues for the ensuing year are increased by one dollar, making the dues now $4.00 per year.

The increase is in the amount paid per member to the National Dental Association and is for the purpose of establishing and furnishing each member a monthly National Dental Journal in 1917.

F. R. Chapman, *Secretary,*
Ohio State Dental Society.

American Institute of Dental Teachers

The next annual meeting of the American Institute of Dental Teachers will be held at Hotel Adelphi, Philadelphia, Pa., January 23, 24, 25, 1917.

A number of papers, reports and discussions relating especially to dental education will mark this meeting. All dental teachers are cordially invited to be present.

Abram Hoffman, *Secretary,*
529 Franklin St., Buffalo, N. Y.

OBITUARY

Loomis Pomeroy Haskell

(Born April 26, 1826; died October 7, 1916.)

DR. LOOMIS POMEROY HASKELL, the oldest practicing dentist in this country and probably in the world, died October 7, in the Presbyterian hospital, Chicago, following two operations for kidney trouble. He was 91 years old.

Since 1858 Dr. Haskell had been practicing dentistry in Chicago. He went to that city from Bangor, Me., where he opened an office seventy-one years ago.

An author of numerous books, Dr. Haskell was known internationally and founded the Haskell Post Graduate School of Prosthetic Dentistry, which has graduated pupils from very nearly every country on the globe.

Among his patients were many famous personages of both this country and Europe. One of his closest friends and patients was Gen. Phil. Sheridan. A year ago Dr. Haskell retired after an international lecture tour, in the course of which he appeared before clinics in Berlin, Vienna, and Paris. During his long life he lectured before many American universities.

Dr. Haskell was the recipient of many degrees and awards for his proficiency in dental surgery. The award he most valued was a gold loving cup presented to him on the golden anniversary of his entrance to the profession by the dentists of Paris.

In 1915 he was elected the honorary president of the American Dental Congress at the annual convention in San Francisco.

Dr. Haskell is survived by his only daughter, Mrs. William T. Barr, of LaGrange, Ill., with whom he had lived for many years.

Dr. Haskell was a frequent and always an interesting and instructive contributor to THE DENTAL SUMMARY, his last article, probably the last ever written by him, appearing in the August number, bearing the caption "Articulation of Teeth."

He maintained the activity of mind and body to the last, always speaking of how well and strong he felt, despite his more than ninety years. During the last year or so, he complained rather strongly of failing sight, which, in view of his splendid digestion and other unfailing powers, he could not understand or accept patiently.

Dr. Haskell was very proud of the fact that he had been a printer in his early years, declaring that he was the oldest printer as well as the oldest dentist in the world.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

To Intensify Heat of Blowpipe

The heat of a gasoline blowpipe may be intensified by adding a small amount of ether to the gasoline.—*C. E. Fellman, Gold Nuggets.*

The Only Cure for Pyorrhea

In the final summing up of the treatment of pyorrhea alveolaris, remove the cause and Nature will do the rest. Medicines are absolutely unnecessary.

—*J. C. Jones, Dental Items of Interest.*

Susceptibility to Cocain Poisoning

Patients once having been poisoned by cocain are susceptible to very small doses, a fact we should bear in mind when patients give us such a history.

—*J. E. Stoffer, Michigan Dental Journal.*

Preparing Cavities

In the preparation of cavities, if the bur be continually dipped into a vessel containing ethyl chlorid, the pain caused by drilling will be considerably diminished.

—*William A. Love, Commonwealth Dental Review.*

Advantages of Elevators

In the case of badly broken-down teeth, roots that are badly broken down below the gum, and in the case of hidden roots, if a forceps were used it would mean considerable fracture of the alveolar process, and more or less laceration of the gum By the skilful use of an elevator these can be avoided.—*E. W. Paul, Dominion Dental Journal.*

Amalgam vs. Gold Inlays

I am thoroughly convinced that many of the operations we are doing today with gold inlays would be very much better done with amalgam fillings properly made. Because of the fact that we can get a much larger fee for a gold inlay, we have put in more inlays and less amalgam fillings, than we should. Why not buy amalgam that is right and use it in the way you know it ought to be used? Why not make fillings of this material that are many times better than a good many of the gold inlays put in today, and do better service and get paid for it, as I am sure you can if you make up your mind to do so.—*A. D. Black, Dental Review.*

The Proper Finish of Amalgam Fillings

There is absolutely no more reason for polishing a gold operation than there is for polishing an amalgam operation; yet how many neatly carved and polished amalgam operations do we see in our daily examinations? Why do we apparently forget that rough, unfinished cervical margins invite early and complete failure and that operations without a contact point or what is nearly as bad, an imperfect one, means always a source of trouble and inconvenience to the patient and ultimately results in a pyorrheal condition, causing the loss of the tooth.

—Jean Cline, Northwestern Journal of Dentistry.

Diet in Pyorrhea

Those under treatment for incipient or chronic *interstitial gingivitis* (unless contraindicated by some organic disease) should eat freely of fresh vegetables every day, particularly succulent uncooked ones; all the fresh fruit they can when it is in season, and unless engaged in hard manual labor or taking violent exercise, very little meat. Sufficient protein to meet the body requirement of the average man may be obtained from eggs, milk and milk products.

—John S. Engs, Dental Items of Interest.

Elasticity of Inlay Wax

Dr. W. A. Price discovered that wax is elastic, and by reason of the pressure applied to it in forcing into the cavity is in an abnormal condition, and upon releasing from the cavity by reason of its elasticity it has a tendency to resume its normal condition, which causes a distortion of the wax and a consequent misfit The release of the elasticity is accomplished by heating the wax while it is still in the cavity, by directing a syringe full of water as hot as the patient can stand it. In large M. O. D. inlays I take the additional precaution of melting the wax over the occlusal step where the two approximal portions of the inlay are bridged together.

—J. V. Conzett, Dental Items of Interest.

Restoring the Contact

When you are called upon to insert an inlay or filling in a case where the contacts have loosened you should wedge the teeth till you tighten the contacts on either side and then you should make the mesio-distal width of the inlay a little bit greater than would seem necessary to make a tight contact, and force that inlay in every case until the patient complains When you drive the inlay to place, the patient will say: "That is too tight, doctor; I can't stand that" But you can assure them that it will not be uncomfortable any appreciable length of time. In doing that you not only secure a good contact in the tooth you are operating upon, but tighten the contact of the other teeth on that side I look upon the tightening of the contact all along the arch as one of the important things —*C. N. Johnson, Western Dental Journal*

To Prevent Thumb-sucking in Children

Dr. George H. Henderson calls attention to a very ingenious method of preventing thumb-sucking suggested to him by Dr. Truman W. Brophy. Make a pasteboard cuff to the right size and length to slip on the arm, small enough not to slip off the hand. Sew cotton or other material on the edge to prevent it from irritating the hand. It can be bound with adhesive tape or straps and buckles. This will prevent any use of the elbow, and it is much more humane than the use of bitter drugs and other such expedients.—*Dental Review.*

To Cast Alcolite Successfully with Steam Pressure

The following method will give results: When ready to cast, take a small iron washer, about size for 5-16 bolt. Heat to bright red over Bunsen burner, drop into casting ring over molten metal ; apply moist asbestos pad quickly, and no failures need occur, as the hot washer developes plenty of steam.

(Note.—In seeking about for a material suitable for the restoration of cavities involving the incisal angle of the anterior teeth of the troops of the Expeditionary Force, I have found acolite to be excellent for the purpose.

—E. S. Fischer, L.D.S., D.D.Sc., in The Australian Journal of Dentistry.

Restoration of Occlusal Surface Important

Recently at one of our study clubs one of the dentists present asked me about an inlay with which he was having trouble. Food was packing in between the teeth to such an extent that he was not using that side of his jaw at all in mastication. I found an inlay with a close contact, but a wide one, and on examination saw that the occlusal surface had been finished with a flat surface. I trimmed the contact a little to make it narrower and then carved the occlusal surface to form, with the pits and fissues reproduced as well as I could under the circumstances. He went home and ate a chicken dinner on that side of his mouth without a shred of food finding its way between the teeth, and during my stay in that city he continued using the tooth with perfect comfort. I only use this as an illustration of the importance of always restoring the occlusal surface of the tooth in order to maintain masticatory efficiency and as a preventive of the distressing condition of food impaction.—*J. V. Conzett, Dental Review.*

Method of Mixing Almalgam Fillings

In the *Dental Review,* Dr. Harper describes the manner in which he mixes amalgam fillings as follows: The proper mixing of amalgam is best accomplished by the use of a deep glass mortar—the inner surface of which has been slightly dulled, not ground and pestle of such design as to afford a firm grasp being taken of its handle. The head of the pestle should also be slightly dulled. The time required and the rapidity of movement of the pestle necessary for thorough amalgamation make the use of the shallow mortar impracticable because of the danger of loss of some of the contents during the operation. A rough inner surface of the mortar tends to grind the alloy, which is objectionable, to say nothing of the extreme difficulty in completely removing the plastic mass, and keeping the mortar clean. Mixing in the deep glass mortar should be done thoroughly by a rapid movement of the pestle in such manner as to keep the mix always at the bottom of the mortar; this will necessitate the constant rubbing or shaking down of that portion which collects on the sides. The force exerted in mixing should not be one of grinding, but of moderate rubbing together, to accomplish the most complete amalgamation. Such mixing should be continued for two minutes by the watch as a minimum length of time, followed by kneading the mass for one minute. This time requirement applies to all mixes made of from ten to thirty grains of alloy, but a mix of less than ten grains might require a little less time, and a mix of more than thirty grains will require more time. Some alloys may possibly require a little more time for mixing, but never less. I am speaking of the high-grade alloys, containing 65 to 73 per cent. of silver, as these are the only alloys worthy of consideration.—*British Dental Journal.*

Removing Glass Stoppers from Bottles

The application of force, or heating over a flame, very often leads to breakage of a bottle from which the glass stopper cannot be removed. It is better to apply a few drops of fine sweet-oil around the stopper, and to allow the oil to remain for a short time, when the stopper can be turned. Or hold the bottle firmly between the knees, wrap a thick twine twice around the neck of the bottle, and pull the ends of the twine to and fro. The neck of the bottle is thus heated, and expands, while the stopper retains its own temperature, and can easily be lifted off.—*Pawelz' Zahntechnische Reform, Ash's Monthly.*

Apoplexy During Administration of Somnoform

Mary C., age 61, attended the Hospital for the purpose of having a number of carious teeth removed. She was extremely nervous, and it was agreed that she should have a general anesthetic. Somnoform was chosen, and given by the semi-open method. She made an uneventful recovery, but, on attempting to leave the chair, complained of her inability to walk without assistance. The first sign of trouble was noticed by the drooping of the left corner of the mouth, and then gradual spreading paralysis of the left side of the body. Two hours later the woman was completely paralysed down the one side. The only history of illness she could relate was that she had been suffering from her back for some time. She is now an inmate of one of the general hospitals, and is making slow progress towards recovery. I cannot find a similar case recorded. The anesthetic was probably an exciting cause, but I consider that the nervous excitement prior to the operation must have been the original factor in bringing about the cranial hemorrhage.—*E. S. Fischer, L.D.S., D.D.Sc., Australian Journal of Dentistry.*

Ulcerative Stomatitis

Arthur P., aged 10, was brought to the Melbourne Dental Hospital on November 9th, suffering from an ulcerative stomatitis. His mother related the following history: He was always a delicate child, and had been suffering for some time with bronchitis, for which he was under treatment. About six weeks before coming to the Hospital, it was noticed that the gums round the upper incisors were inflamed, and a little later began to recede from the teeth, and showed well-marked signs of ulceration. Pus was profuse, and gradually the teeth became loose, and finally the two permanent centrals and the left lateral came away. The condition did not improve, and he was brought into the Hospital for treatment. When I saw him, on the 9th, the condition of the child was extremely grave. He was showing well-marked signs of toxaemia, with furred tongue, vile breath, and the condition of the mouth was so bad that I diagnosed the case as one of gangrenous stomatitis, or noma. As a matter of fact, it was at that period just lying between the two conditions—too severe to be an ulcerative, and not severe enough to be called noma. Practically the whole of the premaxillary was necrosed and the tissue gangrenous, while the upper lip had suffered to a large extent, showing deep punched-out ulcers with ragged edges. The old sockets from where the teeth had been lost were deepening badly, and there was every indication that the nasal cavity would be involved. Owing to the irritation set up, the lingual portion of the gingival tissue had hypertrophied, and hung in a large flap into the mouth. This flap was ulcerating, and throughout the tissues necrosed pieces of bone could be seen projecting. As the boy was very low, I simply removed as much of the dead tissue as I could, douched thoroughly with H_2O_2, and applied iodo-glycerol freely to the parts. He was put on general treatment by his medical attendant. Under the combined treatment the boy's condition improved, and on Saturday, 13th November, a general anesthetic was administered, which, by the way, he took extremely badly, and I curretted the diseased portion thoroughly, removed the gangrenous flap, and also had to extract the other permanent lateral and first left upper bicuspid, as they were completely separated from the tissues, being simply surrounded by dead bone. After treatment has been simply the application daily of iodo-glycerol, which has been marvellous in its action, and the H_2O_2 douche. He is now doing well, and, unless anything unforseen occurs, should make a good recovery.—*Australian Journal of Dentistry.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

The delay in publication of the October SUMMARY was occasioned by inability on the part of our printers to secure paper in time. Orders placed in June were not filled until late in September, and slow transportation accounts for the rest. We now have supplies for several months, and the delay shall not occur again. We aim to have the SUMMARY in the mails not later than the third of any month; if not received promptly, notification to that effect will be appreciated.

The mid-weeks of October were very busy ones for me. I had the pleasure of attending and taking some little part in two splendid conventions, the Northern Indiana, at Kokomo, and the First Indiana District at Evansville. Both were well attended, and both were filled with the spirit of work and service to a most unusual degree. The First District meeting was particularly well handled. At the close of the first day, a retrospect of accomplishment seemed to arouse a doubt that so much could be done in so short a time.

The profession over in Indiana is just now pretty thoroughly aroused as to its immediate duties in connection with opposition to a movement that seems to have for its ulterior purpose a letting down of the bars; of the overturning of all advances made during the past forty years. Now, let the great movement for the education of press and public be carefully planned and vigorously carried out. There is work there that may well become any man

I sincerely hope that Dr. Sexton particularly, and every other dentist as well, will most carefully read the article by Dr. F. W. Sage, of Cincinnati, in this number. Dr. Sage writes strongly, clearly and succinctly, and from the standpoint of long experience. All of our readers may not agree with his conclusions, but all owe it to themselves and their profession to read and carefully consider all that he says.

Now turn back to the Symposium on Dental Infections and Systemic Diseases, by three noted physicians, Drs. Morehead, Billings and Irons, and read every word of the three articles and the discussion. There is a lot of good, sound sense in them, particularly the remarks by Dr. Irons concerning the root-canal spasm and foci, now so seriously aggitating some of the brethern. It is well to know the right, but it is better to do the best that can be done under all circumstances.

A writer in this issue of THE DENTAL SUMMARY makes two very significant statements. They are these: Only about 10% of the patients visiting he average dentist can afford to pay for the kind of root-canal operation now considered necessary by the most advanced men; and, only about 10% of the most progressive and able dentists are able to perform such operations successfully. What, then, is to be done *for* the other 90% of the patients, *by* that other 90% of the dentists? Why, just precisely what always has been done: The conscientious dentist will do the best he can, give the best service that is in him, availing himself of every help offered in the way of improved appliances, instruments, medicaments and armamentarium generally; in other words, do the next best thing, not attempting operations that are beyond his skill, if not, indeed, beyond the skill of any man, at a cost beyond the ability of his patients to pay.

On the theory that "A cat may look at a king", I suggest that the Research Commission of the National Dental Association build a mammoth set of teeth in sections—big fellows, eight feet or so high, large enough to show every part of the internal structure broadly and strongly; for instance, some of the root canals might be big enough to permit an average man to get into them. These should be correct reproductions of natural teeth, to be used for the purpose of study; and, I am just foolish enough to believe, would do more good than all the spasmodic theories and undemonstrable propositions and half-conclusions that might be promulgated in a year. Such a work would have genuine educational value, to say the least. This idea is not patented, and is subject to amendment without notice.

I have had letters from a number of dentists inquiring as to how best to start the movement for the establishment of a municipal clinic. All inquirers on this subject are referred to the article by Drs. J. O. Zubrod and Victor H. Knapp, printed in the September SUMMARY. When this has been read and digested, I shall be glad to reply to any questions that may arise, and to do my best to help. The work is of very great importance and I cannot fail to be greatly interested in it.

St. Paul's first free clinic was opened October 2, under the supervision of its founder, Dr. M. O. Nelson, who, by the way, more than suspects that developmental insanity or imbecility may result from the early loss of teeth on one side of the mouth, causing arrested development and consequent suppression on that side.

Mason City, Iowa, has a free clinic.

And the matter also is being agitated at Oshkosh, Wisconsin.

Charged that Chicago's dozen or more free clinics are nothing more than auxiliary clinics at which dental students practice on the patients regardless of results. Serious charges of malpractice have been made and the matter is being investigated. It is likely that the whole matter will be taken out of the hands of the health department and turned over to an association formed for the purpose of general supervision.

The world surely "do move". Waltham, Mass., the town that made watches famous, is now "thinking of doing something toward the establishment of dental inspection and free clinics—next year".

There should be one-fifth as much glass in windows as there is floor space in schoolrooms and other like buildings.

The work of inspection began in Kansas City schools on October 9. Four school operating rooms are to be established by private beneficence, all of which will be manned by members of the local society.

Here's a hint: The Woman's Auxiliary of the St. Paul Dental Society is considering the plan of having school-children collect a carload of rags, the value of which approximates $3,000, for the purpose of paying the expenses of free dental clinics. Of course, all sanitary precautions will be observed.

The United Charities of St. Paul opened an adult free clinic September 28. So far as I know this is the second adult free clinic, the first and original being that at Evansville, Ind.

When "gentle woman" goes after a thing she usually gets it. That's because she has learned to know what she wants and then GET it regardless. Kansas City inspection and clinics would still be a dream had the women not taken up the work, demanding to know why nothing had been done and refusing to take stand-offs. If you are thinking of doing anything in the line in your town, get a few women interested; then just stand still and watch their smoke. Woman has only played at doing real things for so long that she naturally is hungry to make her mark when something worth while gets into her hands.

Children having excessively bad teeth will not be allowed to attend Hawthorne, N. J schools, until they have visited the free clinic and had their mouths put in order.

Free clinics have been established in Newport and Covington, Ky., room being provided in one of the hospitals in each city, and members of the Northern Kentucky society giving their services free.

Children in Decatur, Ill., schools must show health certificates before admittance to schools; good teeth are required as one factor.

There is now a great deal more work offered dentists than they can find time to do. The idle dentist, waiting for patients, is a thing of the past. Do you remember conditions prior to the beginning of the oral hygiene movement?

Dr. H. J. Harris, Portland, Ore., has patented a device by which means are provided for treating teeth that have been crowned without removing the crown. It is understood that the Detroit Dental Mfg. Co. is arranging to manufacture the device.

Dr. Minor J. Terry, Pulaski, has been appointed secretary of the New York State Board of Examiners.

Dr. F. R. Henshaw, Indianapolis, is chairman of a committee of the Children's Aid society, which will undertake the work of instructing children in the care and preservation of teeth.

Always bear in mind and emphasize the fact that free dental service to children is purely educational and has for its aim the betterment of the coming generation, physically, mentally and morally.

Doctors worked over a Trenton, N. J. boy for three days, diagnosing infantile paralysis; then a dentist happened in, took a look, said "toothache", and it was all over; and there were three physicians on the job!

Sawiyi Misawa is the euphonious name of a Japanese girl who will soon begin the practice of dentistry in San Francisco, being the first woman of her race to practice in this country.

A new Virginia law provides for a dentist on the State board of health.

The Utica free clinic, made possible by donations from the Rotary Club, is now well under way, and reports good work. If YOU are in a quandary as to how to start local work in this direction, write to Dr. H. P. Bremer, Utica, N. Y., and ask him how they did it.

Complimentary Dinner to Dr. L. L. Barber

At the Commerce Club, Friday evening, October 13, the Toledo Dental Society tendered a complimentary dinner to Dr. L. L. Barber, newly-elected president of the National Dental Association, attended by some fifty of his local associates and friends and a number of prominent guests from out of town.

The committee of arrangements, under the chairmanship of Dr. J. W. Hartshorn, left nothing undone to make the affair most agreeable to all in attendance. The dinner was one of those perfect little events that help to smoothe the pathway of life, and break the monotony of the workaday world.

Dr. Everett M. Cook, president of the local society, acted as toastmaster and acquitted himself very creditably. Among the prominent men who responded to toasts were: Dr. Weston A. Price, Cleveland, Ohio, head of the Research Commission of the National Association; Dr. Otto U. King, Huntington, Ind., secretary of the National Association; Dr. T. I. Way, Cincinnati, president Ohio State society; Dr. Homer C. Brown, Columbus, first president of the re-organized National Association; Dr. Henry Barnes, Cleveland; Dr. Frank M. Casto, Cleveland; Dr. N. S. Noff, late Dean of Dental College, Michigan University, and Dr. J. K. Douglass, Sandusky.

Many Toledo dentists also spoke, most of them with much feeling, referring to the kindly help extended to them by Dr. Barber, professionally and otherwise. Mr. F. G. Crandell, president of The Ransom & Randolph Co., was called upon, and spoke briefly of Dr. Barber's long association with the House as friend and patron.

Notes were taken and a digest of the addresses will appear in a later number of THE DENTAL SUMMARY, which is proud to number Dr. Barber among its friends.

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is an unirritating, non-caustic antiseptic solution, well adapted to many requirements in **Dental Practice.** It is the strongest and safest of the antiseptics available for daily use as a wash for the mouth and teeth.

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being slightly acid, is most valuable and effective in preventing the multiplication of various micro-organisms which thrive in the normally alkaline saliva of the mouth.

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because of its slight acidity and aromatic flavor, stimulates the flow of saliva and thereby assists in maintaining a healthy equilibrium of the fluids of the oral cavity.

".The Dentist's Patient" is a booklet designed to impart useful information to the patient regarding the teeth and their care, and advocates frequent visits to the dentist's office. We publish and deliver these booklets free of cost in lots not exceeding 200 copies, imprinted with the dentist's name and address when desired.

LAMBERT PHARMACAL COMPANY
TWENTY-FIRST AND LOCUST STREETS, ST. LOUIS, MO.

More Trouble for the Western Reserve

Our readers will remember an article printed in The Dental Summary some months since concerning a suit brought by the State board against Dr. Brown, of the Western Reserve Dental College, for the alleged employment of an unlicensed assistant, and that the case was decided in favor of Dr. Brown. On August 3, last, a new complaint was filed against the Western Reserve people, alleging that they are guilty of certain violations of law in that legal requirements as a college have not been met. On September 14, last, the Attorney General issued a decree declaring the college in default and that any degrees issued or to be issued by said college were and would be illegal and invalid. This is, of course, a victory for the State board, and what the final outcome may be is very problematical.

Later—The school authorities state that all legal matters have been taken care of, and that all other questions will be settled to the satisfaction of the State Board, at an early date.

Vermont—Rutland County

The annual meeting of the Rutland County Dental Society was held Wednesday October 4, and the following officers elected for the ensuing year: President, W. Burton Holmes, Brandon; Vice-President, Carter R. Woods, Rutland; Secretary, Grace L. Bosworth, Rutland; Treasurer, Paul H. Blanchard, Rutland.

Regular meetings are held each month, and have proved to be most helpful, nearly all the dentists in the county being members of the society.

Ohio—Clark County

Springfield, September 19.—Election of officers occupied the attention of the members of the Clark County Dental society at their annual meeting held for that purpose in the Commercial club rooms. The business meeting was preceded by a squab dinner.

The election resulted as follows: W. F. Brand, Urbana, president; C. M. Evans, Springfield, vice-president; E. A. Dibert, Springfield, treasurer, and R. Wood, Urbana, corresponding secretary.

Plans for the work of the coming year were thoroughly discussed. It was decided to open the free dental clinic for the school children of the city, Monday Septemper 25, at the Central school building. Clinics will be held every Monday morning and Wednesday afternoon and the members of the dental society have volunteered their services at these times. The school board furnishes the material. Miss Mary T. White, the public health nurse, who looks after the health of the children in the public schools, sends them to the clinics for treatment. The different dentists of the city take a turn in alphabetical order.

West Virginia—Monongahela Valley

Fairmont, W. Va., Oct. 14.—The Monongahela Valley Dental Association at a meeting held here elected officers as follows: President, Fred Hess, Fairmont; vice-president, Claude H. Layman, Fairmont; secretary-treasurer, L. A. Stark, Shinnston. The principal speaker was Dr. L. J. Walker, of Grafton. The next meeting of the association will be held in Grafton, early in December.

Ohio—North Central

Fremont, Oct. 20.—North Central Ohio Dental association in session here has chosen Sandusky as the next convention city. Dr. C. W. Stoup of Norwalk was elected president.

Nebraska—Northeast

Norfolk, Neb., Sept. 13.—The new officers elected today by the Northeast Nebraska association are as follows: O. A. Runyan, Stanton, president; H. A. Merchant, Randolph, vice-president; C. E. Balzell, Stanton, secretary-treasurer; H. W. King, Omaha, superintendent district societies.

Not Worth While

Little Kate with swollen face and streaming eyes, strenuously opposed her mother's plan of visiting the dentist. Her mother gained a complete victory by promising her a kitten for which she had been longing for weeks.

The gas had been duly administered, and the wretched tooth dragged from its lair. Kate began to wake up. Then she felt her aching head, and became aware of the pain in her gums. Then she was violently sick.

Lying back in her chair, exhausted and miserable, she suddenly startled the dentist by exclaiming:

"What a rotten way to get a kitten."

ROBBERIES

Lake Forest, Ill., $100.

Council Bluffs, Ia., $12.

Iowa City, Ia., $75.

Evanston, Ill., $100.

Brockton, Mass., twenty-two offices, $1,000. All had been warned by the police, but none of the victims paid any attention to the warning.

Herrin, Ill., $450.

DEATHS

At Minneapolis, Minn., September 29, Dr. Philo S. Calkins, one of the pioneers in the profession in the northwest. He had practiced at Minneapolis since 1871.

At Swedesboro, N. J., October 9, Dr. Wilbury F. Luffbary, of appendicitis, aged 32.

Near Ingleside, Ill., September 21, Dr. P. C. Regan, of Waukegan, was killed when his auto turned turtle. He was returning from a fishing trip. He was very popular, and his funeral was attended by thousands.

At Cresson, Pa., September 20, Dr. J. B. Mahn, of Altoona, was killed when an auto in which he was riding collided with a passenger train.

At Dover, N. J., October 5, of cancer, Dr. Samuel Burke Johnston, Sr., aged 73.

At Woodsfield, Ohio, September 26, Dr. J. J. Sulsberger, aged 42.

At Cortland, N. Y., September 29, Dr. George A. Tompkins, after a long illness.

At Lewiston, Mont., September 20, Dr. Don Q. Rathbone was accidently shot and instantly killed, while preparing to clean his gun. He was 38.

Classified

Advertisements under this heading, $2.00 each for 60 words or less, additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

FOR SALE—Dental office and furniture, established ten years, in a rapidly growing city of twelve thousand. Only four other dentists in city. Exceptionally fine opportunity for some one looking for a location. Best reasons for selling. Call or address: 1170C, 332 7th St., Barberton, O.

FOR SALE—A rare opportunity for right man. Established high class ethical practice in Missouri city of 100,000 population. Electric equipment up to the minute, good as new. Average cash income, $7,000.00 per year. Suite of rooms down-town office building. Rent reasonable. "Reasons."—Leaving city and going into specialty. Will sell for less than invoice of equipment. Don't apply unless you mean business. Address: 1180C, care The Dental Summary.

FOR SALE—Modern equipped dental office and $3,000.00 practice in Dayton, Ohio. Located in down-town office building. Established twelve years. Rent is low, and includes steam heat, electricity, gas, hot and cold water and Janitor service. Will sell for less than invoice. Owner leaving city. Address: 1130C, Department 1010, The Dayton Dental Supply Co., Dayton, Ohio.

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FOR SALE—Well equipped dental office and good practice in thriving Ohio county seat town of 15,000. This office has been in same location for fifteen years. Rich surrounding farm country. Best location in city. Rent cheap. High class practice, and a good place for the right man. Price, $750.00. Good reasons for selling. Address: 1150C, care The Dental Summary.

WANTED—First class laboratory man who is a good gold and rubber worker. Good position waiting. Address: 1120C, The Sam'l. A. Crocker Co., 18 W. Seventh St., Cincinnati, Ohio.

FOR RENT—Fine suite of dental rooms, in splendid location on prominent corner second floor; steam heat; free water; rent only $12 per month. Occupied as successful dental office for fifteen years. No better location in the city. Address: Julius Bracher, Galion, Ohio. 1110P

YOUNG'S POLISHERS

The heads of the screws are imbedded in the soft rubber and can not strike the teeth or fillings. This improvement permits of the use of smaller sizes, which do the work more rapidly and effectively. The polishers are designed and made so they will spread out on the teeth, conforming to their contours, and will polish under the gingival margin without injury. They are truer and smoother in the running than any others.

The A Polisher is used chiefly on the concave surfaces and in the fissures. The B and D Polishers are for the anterior surfaces and places easy of access. The only difference between B and D is their size. The B Polisher is most commonly used. When used with the right angle nearly all the surfaces of the teeth may be reached with it. The C and E Polishers are inverted cups for use on the palatine, lingual and distal surfaces. The C is for children and the E for Adults.

Price: 50 cents per doz.; $5.50 per gross

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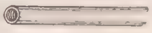
Young's Mandrels are made for these polishers and are not intended for any other uses. They are made for No. 7, and other universal Hand-pieces, and for Right Angle No. 2.



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Price, per set of 5, 10 cents.

For No. 2 R. A. with protecting cap, **15 cts. each, 6 for 75 cts.**

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Jelenko cased bars do not wear off because the 18k gold casing is very thick, forming ONE-FIFTH of the bar.

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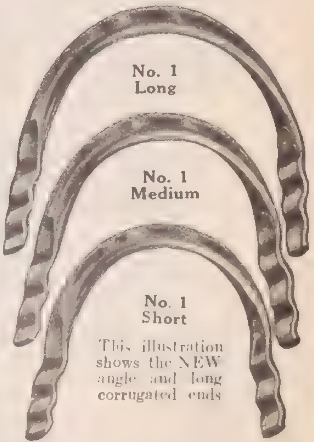
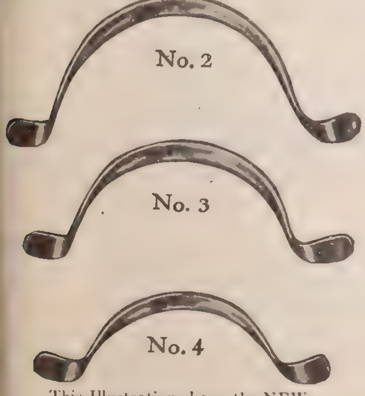


This illustration shows the NEW angle and long corrugated ends



This Illustration shows the NEW angle and ridge

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Solid Gold Bars (16k gold) with 2% platinum, No. 1 long and No. 2	$2.25
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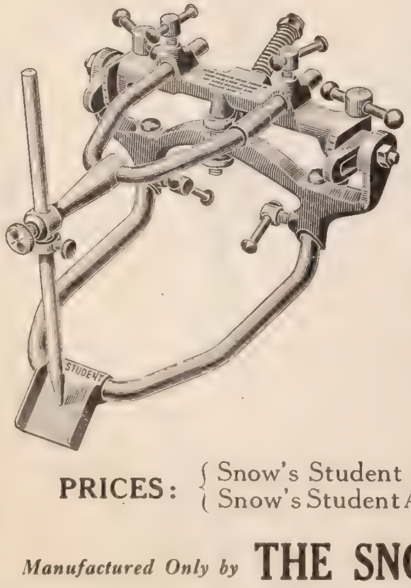

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THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVI DECEMBER, 1916 No. 12

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REGULAR CONTRIBUTIONS

CONSERVATION OF GUM AND TOOTH TISSUE*

BY DR. HENRY BARNES, CLEVELAND, OHIO

CONSERVATION OF gum and tooth tissue is the act of keeping or protecting these tissues from loss or injury and is therefore the real function of dentistry.

The dentistry of yesterday has been almost entirely a proposition of repair and substitution with but little or sporadic attempt at prevention. Here and there we have had those who have really tried to teach and practice prevention of:

1. Decay.
2. Gum diseases.
3. Loss of tooth function.

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*Read before the Northern Ohio Dental Society, 1916

The failure of artificial cleaning by both patient and general dentist has already led to the establishment of a new dental specialty—prophylaxis—which aims to conserve dental tissue by careful instrumentation periodically applied, and supplemented by *ad interim* co-operation of the patient.

In the treatment of calcareous deposits, gingivitis, spongy gums and pyorrhea, from Dr. Riggs to Dr. Smith, and to the present, the practice has been and is mechanical cleansing, in spite of the theory of systemic origin.

The restoration of contours and plus-contours, in fillings, inlays, crowns, and artificial teeth, and the regulation of teeth, are factors in the conservation of tooth and gum tissues in that, during the process of mastication, they provide for the protection of gingival margins, the proper shedding of food and the necessary stimulation and massage of the gums, particularly the gingival and septal gum tissue.

The conservation of dental structures is demonstrated in normal occlusion noted in the dental examination of Italian children at Murray Hill school, Cleveland: Seven per cent. had normal occlusion with perfect teeth and gums; thirty-five per cent. had practically perfect occlusion and perfect teeth and gums. Very few of these ever had used a tooth brush; they apparently did not need them. All other schools had only three per cent. perfect and many of these used tooth brushes. These percentages emphasize the value of regular teeth.

A conservative estimate of the prevalence of irregular teeth would be eighty-five per cent. Irregularities tend to and do cause injury to the gingival and septal gum tissue by abnormally deflecting food. In irregularities the septal gum is usually cramped and is thus less able to resist injury than normal gum. The mal-position of teeth therefore presents problems requiring the constant daily co-operation of the patients to combat this increased liability to injury. In combating this injury we must be very certain that the methods used will not cause other evil effects.

The chief object of this effort is to clearly call attention to, and record a new and definite process of conservation, which shall be taught by the dentist and practiced by the patient. This process is a new method of using the tooth brush, so that it positively will conserve the dental tissues, and eventually the health.

The method can be applied fairly well with brushes now on the market, but the application will be markedly better with a modification of these brushes, or better still with new brushes, all of which will be considered later in the paper.

We recognize the injuries caused by faulty fillings, inlays, bridges, crowns and artificial dentures, but the specific object of this paper is to call attention to the injuries inflicted upon gum and tooth tissue by faulty tooth-brush technic, and to suggest a remedy therefor.

The writer has studied all the stages of prophylaxis up to the present time, either through personal experience or through patients, and has been convinced that none of them are satisfactory.

The success of any prophylactic treatment is very largely due to the co-operation of the patient. The patient often has co-operated to the best of his ability under the instructions given, but these instructions have been faulty.

Vigorous brushing or scrubbing in any direction or by any method, the use of tooth powders and chemical mouth washes, large and stiff brushes, floss silk, rubber bands and tooth picks all have been advocated by dentists and all of them have caused serious injury to teeth and gums.

Brushing methods as advised by the dentists have been wrong in principle, and destructive in practice.

The use of cleansing agents has been advocated generally without definite instructions as to their use and without a knowledge of the evils which might result from their use.

In June, 1902, at a meeting of the Northern Ohio Dental Association at Cleveland, the writer read a paper entitled, "Some Facts and Conclusions Regarding Erosion." This was published in THE DENTAL SUMMARY in October, 1902. The paper was illustrated with casts which showed abrasions and what was then thought to be abrasive erosions, which were due to or aggravated by the use of brush and tooth powder.

Dr. W. D. Miller, writing later in articles appearing in the *Dental Cosmos*, from 1904 to 1907, concludes that "The wasting of teeth is for the most part a purely mechanical process (abrasion) in which the chief and often only factor concerned is the tooth brush in conjunction with tooth powder."

While continuing the investigations of injuries to the teeth from the use of the brush and frictional powders, the writer's attention was attracted by injuries to the gums which were co-ordinate with those of the teeth. A careful study of these lesions strengthened the belief that they were mechanically produced; and later this belief, in conjunction with the findings of Miller, was accepted as fact by the writer. Efforts were put forth to correct the injuries by using various methods of brushing but with indifferent success. Finally in the summer of 1911, while on a vacation, a new brush method was thought out and in September of that same year, experiments in its use were commenced.

The writer had noted that all the popular methods employed in the brushing of teeth, then in use, produced injuries to the gingivæ. The hand-grasp of the brush, and pressure under vigorous muscular tension, scrubbing and brushing to and fro, up and down, circular and rotary, forced the gingivæ from their normal cervical constriction, inducing gingivitis. Then food lodged underneath the lacerated and inflamed gums and being forced between teeth and gums caused spongy gums. Later pockets developed and ultimately pyorrhea was established.

The prophylaxis treatment given by the dentist was often of little avail because the patient by his faulty, irritating, brushing method was daily forcing debris into these brush-formed receptacles. Under the heat of the body, this debris changed to a mass of filth and became the pabulum for the propagation and growth of disease-producing bacteria.

Manifestly, if the gums were to be protected from injury, and debris kept therefrom, the direction given to the brush must be changed. Therefore the new method was evolved.

THE NEW TECHNIC

The Pick Brush. Labial and buccal brush.

The brush, broad, short handle, narrow back, single row of medium stiff bristles alternating long and short clusters—clusters three to six medium large.

Lingual brush.

Illustration—Curved handle and curved brush-back, which will set the bristles essentially (within a few degrees) parallel with the handle. The bristles are set in the back and point in same direction as handle, being set on the inside of the curve of the back. Soft bristles. One, two or three rows of converging bristle clusters. Clusters one to five, depending upon size to be determined, adaptable to infant or adult.

The method of brushing for conservation of dental tissues. —This is called the *shaving* method, because the brush, that is, the side of the bristle ends pointing occlusally, is laid upon the gums in about the same manner that a razor is laid upon the face for shaving. The stroke of the brush being similar to the razor stroke, except that the working stroke is always vertical whereas the razor stroke is more or less diagonal. The motion is applied by a shoulder and arm movement, the wrist motion never being employed except as a mere accommodation or compensation to the arm movement as the brush travels about the horizontal curve of the dental arch.

In the working stroke, the ends of the bristles may be said to act from the region of the apex to the occlusal surfaces, whereas in going back to begin another stroke the bristles slide inertly from occlusal surfaces towards apex.

CARE OF THE BRUSH

A new brush always should be soaked in water over night so that the bristles will be pliable.

After using, the brush should be well washed and then filled with a pure soap, such as castile or ivory, and laid away for the next using. When the soap is washed out with running warm water, the brush bristles will be clean and pliable and in the best condition for use.

The brush is held limply in the right hand with the tips of the fingers—the thumb and forefinger holding the handle close to the bristles, the first, second and third fingers on the back of the brush, the thumb and little finger underneath.

The thumb and forefinger act as the pivot about which the brush rotates as it moves around the arch to accommodate its fullest action to the curves and surfaces of the dental arch.

The second and third and little fingers act as the motors which move the brush handle, maintaining it parallel to the plane of occlusion as the brush is moved around the arch.

Relax all muscles and carefully insert the brush into the mouth, carrying it back to the last right upper molar region without touching the teeth or gums until the brush is laid high upon the gums, the bristles pointing vertically downward. Keep the side of the back of the brush as close to the gums as is possible without touching them and lightly draw the brush vertically downward over the gums and teeth. This forms the working stroke which cleans and gently massages the gums, including the gum septa.

METHOD IN DETAIL

This action squeegees the gingivæ and gum septa, forcing debris out of the gingival margins and otherwise inaccessible portions of the interproximal spaces onto tooth surfaces, and into the accessible interproximal spaces, where the short and long bristle ends scrape, shave or scoop the debris up and carry it away. During brushing it is highly important that the brush be frequently rinsed in running water—warm preferred.

The return stroke is inert except for a gentle gum massage, the bristles sliding diagonally forward from the occlusal margin over the tooth and gums towards the root apices. This action places the brush high on the gums in position for the next vertical stroke. The vertical stroke and diagonal return strokes are repeated again and again with frequent brush rinsing, until the bristles travel around the dental arch as far as the left upper cuspid.

Then the brush is removed from the mouth and reversed, the bristle ends now pointing upward, the finger-hold the same as before. The brush is now in position for action on the lower jaw, from molars to left cuspid. The motion now is vertically upward for cleaning and massaging, and obliquely forward and downward for the practically inert return stroke.

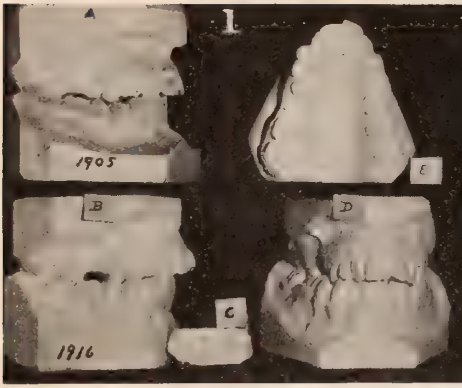
For the left side of the mouth, from left molars to right cuspid, the brush may be held in the left hand in the same manner as for the right side, but since few people are ambidextrous, the following method is advised:

LEFT SIDE BRUSHING—UPPER

The brush is taken in the hand limply as a pen or pencil; should be held between the thumb and first and second fingers of right hand. The thumb is next the back of the brush; bristles point downward. Place the brush on gums in left upper molar region in the same manner as it was placed on the right side. The action is the same as that used for the right side to right cuspid.

LEFT LOWER BRUSHING

The bristles are simply reversed, now pointing upward, and the vertical action is now a push upward.



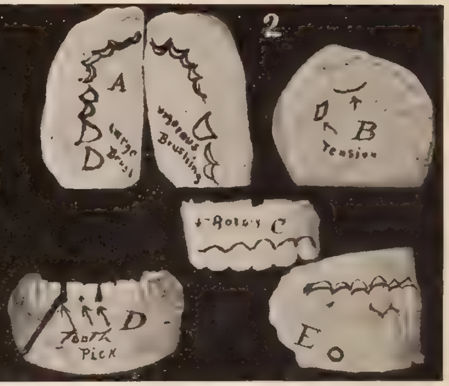
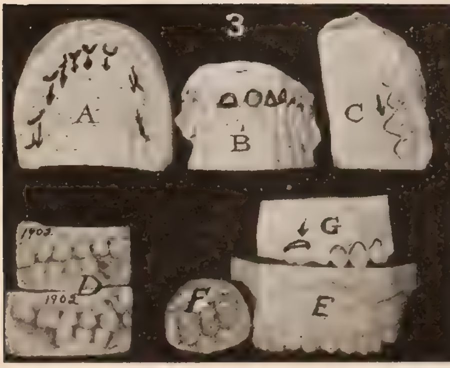


FIG. 1 A. Impression taken in 1905 with tray.
B. Impression taken in 1906 with tray.
C. Impression taken in 1916 without pressure, dropped plaster.
D. Impression taken in 1916 without pressure, with tray.
E. Impression taken in 1916 with tray.

Note the appearance of gums B, C, and E.

FIG. 2. A. Pyorrhea caused by large brush and vigorous brushing.
B. Result of tension from holding brush firmly in the hand, thus preventing freedom in rotating the brush around the lingual arch.
C. Effect of rotary brushing.
D. Lesions caused by wood tooth-pick.
E. Circular brushing effect.



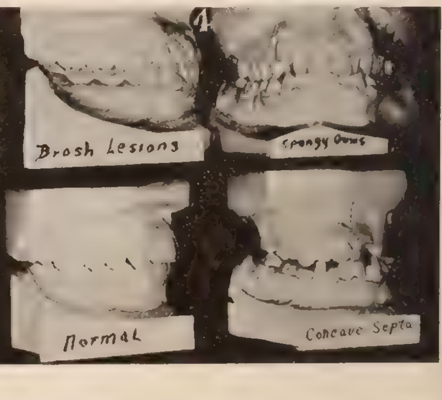


FIG. 3. A, B, C, D, F, G. Lesions caused by vigorous brushing, stiff brush and tension.
E. Irregularity, good effect of shave stroke and a limply-held small brush.

FIG. 4. Effects of incorrect brushing.

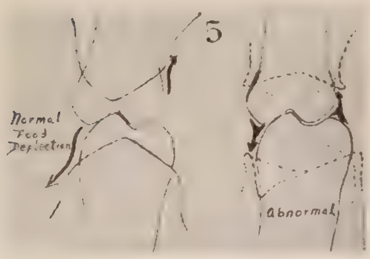
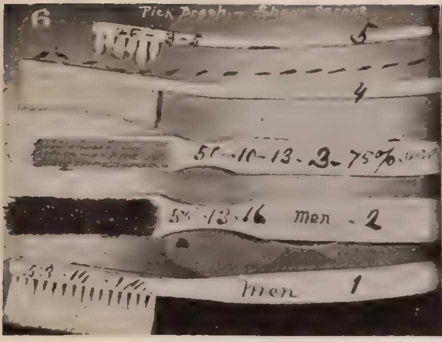


FIG. 5.



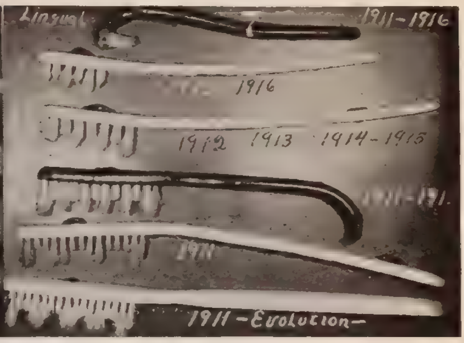
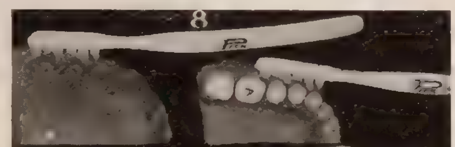
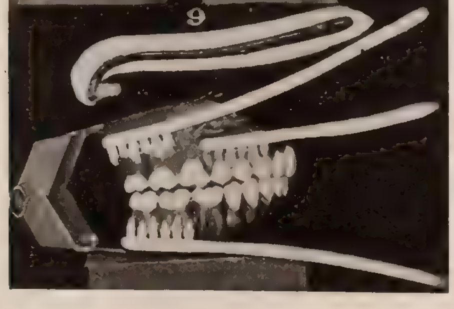


FIG. 6. 1, 2, 3, 4. Large brushes purchased in the open market.

The numbers on brushes 1, 2, 3, 5, refer to the length of bristle rows, width of the bristle rows, and the width of the back of the handle expressed in millimeters.

FIG. 7. Evolution of the Pick Brush during the past five years. As the brush was decreased in size, its efficiency was increased.





FIGS. 8 and 9. Illustrating the application of the brush.

LINGUAL BRUSHING

The brush should be held limply between the tips of the thumb and first and second fingers.

For lingual brushing, the bristles are laid lengthwise upon the gums over the apical region and drawn or shaved over the gums and teeth to the occlusal surfaces. The lingual brush has soft bristles parallel to the handle which practically compels its correct use. The only incorrect strokes of this brush would be mesially or distally oblique to the longitudinal axis of the teeth, or where the brush is held rigidly or used too vigorously. In lingual brushing about the curve of the arch and beyond, the brush itself must be rotated in the fingers to compensate for the curves of the arch.

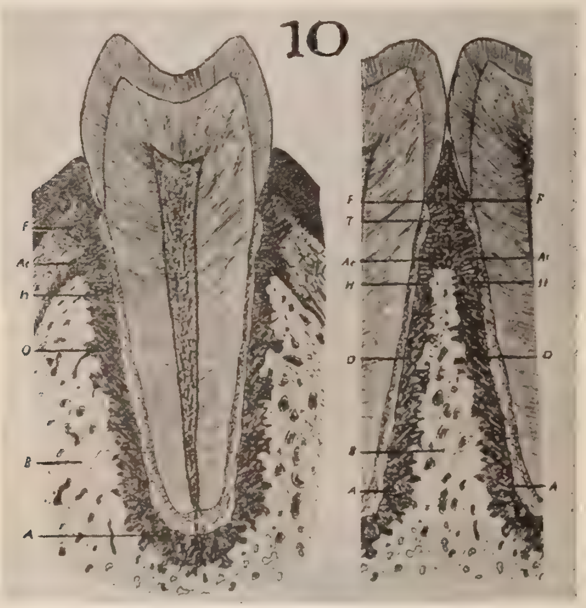


FIG. 10. Diagrams illustrating groups of fibers of the gingivae and peridental membrane. Bucco-lingual section through a bicuspid tooth and investing tissue. F, Free gingivae group of fibers. AC, Alveolar crest group of fibers. H, Horizontal group of fibers. O, Oblique group of fibers. A, Apical group of fibers. B, Bone of alveolar process. Mesio-distal section through two bicuspids and septal tissue. F, F, Free gingivae groups of fibers into septal gingivae. T, Trans-septal group of fibers from tooth to tooth. AC, AC, Alveolar crest groups of fibers. H, H, Horizontal groups of fibers O, O, Oblique groups of fibers. A, A, Apical groups of fibers. B, Bony septum of alveolar process.

—From work of Dr. Black, by permission.

In all brushing, the bristles act as a gum and tooth cleanser and as a gum massage when the gentle working stroke is from the region of the apices to the occlusal surfaces. In the return stroke, the bristles do not lose contact with the tissues—they slide back mesio-obliquely to the apical position without any other action than that of a gentle massage.

The brush bristles laid lengthwise upon the gums and drawn or shaved over them, have, by reason of their flexibility, due to the warm water and soap treatment, a compensating action which massages and cleanses, without injury, every surface over which they pass or act.

All brushing must be gentle and must never be vigorous. The limply-held brush insures gentle brushing.

The shaving action, the limply-held, very small brush and the softened bristles produce a gentle, stimulating massage of the gum tissues, and a cleansing of gum and tooth surfaces without gum irritation or observable tooth abrasion.

The gentle massage, including the squeegeeing action on gingavæ and gum septa, stimulates circulation and the elimination of waste material, thus permitting the healing of the gums and gingavæ by the natural process.

The squeegeeing of the gingivæ stimulates without irritation and hastens the return to and the final re-establishment of normal function, which is evidenced by the pale pink tissue, the firm constriction of gingivæ about the teeth, the convex gum septa, the natural gum festoons and the singular cleanliness of the gingival margins and interproximal spaces.

The small brush with single row of bristles is used because experience has fully demonstrated that one row is sufficient, and more efficient than two or more rows. The small, single-row, narrow-backed brush, used with the shaving stroke, gives a massaging range and a freedom of action without muscular tension, which is impossible with larger brushes.

The elimination of muscular tension, that is the relaxation of all masticatory muscles, permits the limp holding and gentle manipulation of the brush which is so necessary.

Squeegee finger-tip massage in addition to the warm water and tooth-brush, is used for the treatment of pyorrhea. This is performed by placing the tip of the thumb and finger, one on either side of the teeth over the apical region, then drawing them downwards to the surface. This massage should be between the mesial and distal surfaces of the roots of adjacent teeth for the thorough elimination of debris from within the pocket.

In addition to all brushing, gargle the throat with warm water and squiggle the warm water in the mouth, over and around the tissues before and after brushing.

It will have been noted that this new tooth-brush technic does not require the use of antiseptics, germicides or frictional agents other than the tooth brush itself. The results obtained to date seem to show that the mouths and teeth of those patients who use no other frictional agent than the brush, present a cleaner and more healthy appearance than do those using the technic with chemical and frictional agents.

Instrumentation is a necessary adjunct to the treatment, but it is not advisable to make it more than superficial until the stimulating effect of the technic is obtained; then from time to time, as the tissues become more normal, instrumentation may be continued to completion.

The brushing will first clear up the superficial effects and reveal the greater regions which may then receive instrumentation or other cleansing treatment.

With the experience in the treatment of pyorrhea so far, the writer believes that the disease is curable, using the technic as described.

CUMULATIVE INJURIES

Dr. Black in his excellent work in the new special dental pathology, published in 1915, enumerates various sources of injury to the soft tissues, and gives to the use of the tooth brush a minor place as the cause. The writer ascribes to the wrong use of the tooth brush the major place as to cause of injury and for the following reasons:

The tooth brush improperly used is cumulatively aggravating as to injuries inflicted by it and injuries already existing due to other causes. Rightly used, it is also cumulatively benign in its good effects and greatly modifies the injuries due to other causes. This declaration is the result of observation upon presentation of cases in practice, where the improper use of the tooth brush has been employed, and to the almost miraculous change which resulted when the new method was substituted.

From the experience of the past five years, the writer is assured that injuries to the gingivæ due to other causes are of less importance than are those inflicted by the tooth brush. The brush properly used greatly modifies the severity of these injuries and minimizes their ill effects. These injuries, however, eliminated, and the brush then properly used, is followed in a most surprising manner by a restoration of the gum tissue to health. Gingivitis dissapears as if by magic; spongy gums are quickly healed and pyorrhea has been and is being cured rapidly. These facts observed in clinical experience lead the writer to the firm belief that pyorrhea is mainly of a local origin and a filth disease. Pyorrhea in a clean mouth seems impossible. It is too much to expect the profession as a whole to believe the statements as written, but the method is so simple that all can practice it, and the results obtained will compel even the most skeptical to believe. Be it thoroughly understood, however, that all cases of pyorrhea cannot be cured. The writer, however, is not able to place a limit upon the success that may result from a conscientious following of the method as outlined.

Cleansing of the gums and teeth should be performed as often at least as the dishes are washed.

Cleanliness of the mouth and teeth is as essential to health as pure food, pure water and pure air. What avail to insist upon pure food, water and air, when we ourselves insure their contamination, allowing meal after meal to pass without cleansing the teeth. A parallel case to this, though on a larger scale, is that of our city fathers who, in the construction of their water works and sewage systems, empty the outtake of the sewer into the intake of the water works. The writer has known many cases of restored health by the habitual cleansing of the mouth and teeth following each meal. The effect of purified water on the health of a community is well known.

The injuries to the soft tissues have been considered mainly, for the reason that the teeth in the performance and maintenance of their natural functions must be surrounded with the healthy gum tissue. This gum tissue in a healthy condition conserves the hard tissues, not only of the teeth but of the alveolar process.

The teeth which are preserved the longest are the lower incisors and cuspids. This is possibly due to the fact that the sub-lingual glands excrete their secretions underneath the tongue, which is constantly working against these teeth and bathing them in this fresh fluid; consequently, the organisms producing decay find this region a difficult one in which to work due to the disturbance of the plaque which is so necessary to their life. This simple natural fact furnishes a basis for our contention that water often and freely applied to all the teeth may exert a restraining effect upon the propagation of those micro-organisms of decay.

It is an excellent habit frequently during the day to swiggle water within the mouth, to equalize the fluids therein.

Remember, nature is benign and merciful when her laws are observed and followed, but outrage her and she takes the last farthing of her toll.

Pyorrhea is largely a filth disease and to this extent is preventable. Pyorrhea is curable by the method proposed. Cleanliness is its cure and this means in addition to the method given, the performance of any operation that may be necessary, even to extraction.

Nothing has been said relative to the influence of the treatment in abscess cases. This, however, may be said: The stimulation given the tissue can have no other than a beneficial effect when coupled with the other remedial measures. The primal cause of pyorrhea is injury to the gingivæ of the gum septa. The immediate cause thereof is filth, often due to the thrice daily forcing of debris underneath the gum and into the pockets, there to remain until it becomes a mass of filthy garbage.

SUB-GINGIVAL PYORRHEA

The writer is not able to say much at present of sub-gingival pyorrhea, caused from periosteal ulcers, abscessed teeth, or serumal calculus, etc. This may be left for a later paper, in which we hope to have something of value to report.

POINTS TO REMEMBER

While brushing the teeth the hand-hold of brush, tension of muscles, vigorous scrubbing, produce gum injury and ultimately pyorrhea. Large and stiff brushes defeat the purpose for which they were intended. Gentle pressure on the gum tissue always should be from apical to occlusal. The brush should be very small, one row of bristles. Pliability of bristles is assured by filling bristles with soap and washing with warm water. Powders, pastes and chemical agents are unnecessary and, moreover, are regarded as harmful.

Squeegee thumb and finger-tip massage for pyorrhea, brush squeegeeing of the gingivæ and gum septa for elimination of debris from the free margin of the gum.

Swiggle the water within the mouth before and after cleansing and frequently during the day.

Personal instruction to the patient by the dentist; also, have the patients bring their brushes to the office to perfect their technic.

A word of praise is due the National Mouth Hygiene Association for the work already done to secure clean mouths—let us give it our right good will. The Scientific Foundation should be aided in its work of solving the complex problems. The dentist must work with and for the patient, for this is his field of labor—these three if united in effort can perform a mighty work for humanity.

It is impossible to close this paper without a protest against the tenacious holding of theories which long have held us within their thrall, notwithstanding they never have been proven from the facts occurring in daily practice.

The writer believes that the time has come when the dental profession should, in no uncertain terms, place itself upon record as absolutely opposed to the further destruction of the tissues from the tooth brush. We have been wrong in the past; let us be right for the future, in order that the mouth, the gateway to the body, may be maintained in such a condition, physically, that it shall not poison the system which it feeds.

I quote from Dr. Osler, in a recent public article:

> "Man has now control of the most malign of Nature's forces in a way never dreamed of by our fathers. A study of her laws, and observation of her facts—often of very simple fact—has put us in possession of life-saving powers nothing short of miraculous."

The old proverbs teach that filth breeds disease, and that cleanliness is next to godliness. Gently shave the gums and teeth; don't scrub them.

That this paper is incomplete is admitted, but the writer has sufficiently outlined the evil so that the subject may be taken up by the profession investigated and studied, to the end that humanity may receive an added blessing.

DISCUSSION

Dr. Gillette Hayden, Columbus: Dr. Barnes offers a paper on a general subject which is more and more claiming the thought of the dental profession. In fact our attention is rapidly being brought to a focus upon the conservation of the teeth and their supporting structures, and any worthy method advanced, whereby this conservation may be aided or furthered, is a welcome addition to our armamentarium.

The essayist has called our attention to correct artificial restorations and to orthodontic treatment for malposed teeth as factors in the conservation of the teeth and their investing tissues. Notice is called to the existing state of mouth health among the Italian children of Murray Hill School who presented normal or practically normal occlusion. The state of health of these mouths is undoubtedly due largely to normal occlusion and to a thorough exercising of the masticatory function.

There are too few among us at present who have sufficient regard for normal occlusion, and for the proper use of the teeth in mastication as factors of prime importance in the conservation of the teeth and their supporting structures.

We also are reminded that the malposition of teeth is a handicap to any patient, because of the increased liability to injury and disease of the investing tissues, as well as to the teeth themselves. With 85% of people contending daily with this handicap, often plus a mutilation of tissue as well, it is of vital importance that every effort be made to offer each of these individuals especially, some means of rendering their deformity less of a menace to the health of the mouth and the general system. Therefore, Dr. Branes' effort to produce a system of daily care for the mouth, through the exercise of which the patient may accomplish without injury the successful cleansing of the teeth and gums, merits a thorough trial.

This trial I have not yet been able to make, and so I am not prepared to discuss its merits.

The size of the brush which Dr. Barnes presents is, I believe, a distinct recommendation for it, because more and more we are coming to regard the brush which covers a very limited area while in use as the one best calculated to cleanse each single tooth. The smaller the brush the more persistently is the attention of the individual using it called to each separate tooth, and therefore better care is given. Tooth brushes in general, attempt to cover one and one-third surfaces of each of from four to six teeth at one time, while the one shown on the screen will not touch much if any more than one and one-third surfaces of each of two teeth at any one time. I believe that a real advantage is to be obtained by the general use of smaller brushes than usually are employed.

From the essayist's arraignment of prophylaxis as set forth in the statement, "The writer has experienced all of the stages of prophylaxis up to the present time, either as dentist or through patients, and has been convinced that none of them are satisfactory," I am led to inquire as to his definition of the term prophylaxis and to ask further elucidation of this paragraph.

"The success of any prophylaxis treatment is very largely due to the co-operation of the patient," is a statement to which we all can subscribe. To quote further, "The patient has often co-operated to the best of his ability under the instructions given, but these instructions have been faulty." My objection to this remark is that from it we are led to infer that it is the usual thing for dentists to instruct their patients in the daily care of the mouth. This is far from true. In my experience the periodontist is the only one who ever has tried really to instruct his patients *at all*, and so this statement appears to be directed at this group of dentists, chiefly if not entirely; consequently I am ready to defend the efforts put in practice by a body of dentists whose aim is to make it possible for more people to have healthy mouths.

In this connection I wish to state emphatically that I believe that in the matter of the brush, the dentifrice and the method of using them, the greatest damage to the greatest number of individuals has come from the self-selected instruments and the self-acquired methods adopted by each person. There are only a comparatively small number of dentists giving their patients instruction in the daily care of their mouths, and the dentist's sin is one of omission where such instruction is not given. If even half of the dental practitioners had been brought to believe in the necessity of offering to their patients helpful information as to the function of the teeth and their investing tissues, and the need of thorough mastication and insalivation of food, and had been convinced that one of the functions of dentistry is to teach people how to guard against disease of the mouth, Dr. Barnes' offering would appeal to more dentists as the serious contribution that it is.

I cannot admit the sweeping statement that, "Brushing methods as advised by the dentists have been wrong in principle and destructive in practice," because I know that where tooth surfaces have been cared for properly by the dentist, and where the patients have received instruction in the daily care to be given, and "have co-operated to the best of their ability," there has been undeniable improvement in the mouth conditions.

If greater improvement is to be obtained from the tooth brush and method of using it advocated by the essayist, none will be more eager to adopt both than those who already are making great effort to conserve the teeth and their investing tissues.

I thank you for the opportunity of studying the paper, Dr. Barnes, and I appreciate the purpose of your contribution.

Dr. H. C. Kenyon, Cleveland: I knew when I saw Dr. Hayden's name on the program to discuss this paper, that it would be well discussed, and that not much would be left for me to say. However, I wish to offer some advice, and in that advice compliment the essayist.

It is based on the fact that I have personally studied Dr. Barnes' cases in his office, and have received personal instruction from him that is more minute than he possibly can convey to you from a platform; and I am so thoroughly well pleased with this method and the technic that my advice is to get this paper as soon as it is published and study it, because of the difficulty an essayist encounters in trying to tell an audience how to do a stunt at some kind of technic. It is difficult always to grasp a technic without a thorough demonstration going with it.

This is one of the most important subjects we could discuss, and Dr. Barnes has made a great contribution to its study. His is not the end of the study or discussion, but it is the start. He is asking us if we will study it, perfect it, practice it, and report. He has presented some wonderful facts as to brushing the teeth. I am not ready to say that Dr. Barnes' technic is the best that may be developed. It is a better technic than I have been able to develop to date. I think I shall use also some other means of brushing than the ones he has advocated, but I want to call attention to one thing which he has said, and that is the *gentle* and *not* vigorous brushing. Coupled with that I think he should have said that gentle and not vigorous brushing needs to be continued longer to get the same effect of cleansing and massage that is necessary. We must impress this upon our patients. Too many of them grab a tooth brush and stick it under a stream of warm water, and give a jab or two on each side, and they say they have brushed their teeth.

Dr. Hayden has called attention to the fact that there are so few dentists giving any instruction at all to their patients as to how to brush their teeth. I consider it one of the crimes of the profession—the almost absolute failure of dentists to instruct their patients as to what they themselves should do to keep their teeth clean. Nothing is more certain than that the little time we spend with our patients is practically lost unless we can get a co-operation from the patient which is efficient. I do not mean that we usually do not geta mental willingnessonthe part of the patient to co-operate, but he cannot co-operate efficiently if we haven't told him how. He is doing the best he can, and that often does a lot of injury. Even the prophylaxis specialist cannot spend enough time with a large clientele to keep his patient's teeth clean. The teeth must be cleaned several times every day to accomplish the result we need. You cannot get along by cleaning a person's teeth once a month. That is better than nothing of course, but until we have gotten to the point where we teach our patients how to clean their teeth successfully and efficiently, we haven't done our full duty.

How is the patient to learn to efficiently clean his mouth if his dentist does not know how to do it himself?

Proper mechanical cleansing of the mouth has cured and is curing so-called pyorrhea. No cure by any other means ever has been made when that has been ignored. I do not believe any case of pyorrhea ever was cured when the mechanical cleansing was neglected. I do not claim those people who shoot some dope into the arms of their patients, and tell them they are curing their pyorrhea, are not doing some good; but I do not believe any advanced case of pyorrhea has been cured unless the treatment was accompanied by this mechanical treatment, and we know many aggravated cases have been cured by the proper care of the mouth and the proper mechanical treatment.

Dr. Barnes spoke about the use of mechanical cleansing, instrumentation, etc., in connection with this work, and he emphasizes the idea that this work should not be done until after the patient has been put for some time upon this treatment of brushing the teeth according to the method he has described. I am not prepared to advance my opinion as better than Dr. Barnes' on that point, but I am not prepared to agree with him on it. My personal notion is that where there is filth, as there is in quantities around these teeth, with calcareous deposits, that some teeth should be thoroughly sealed and polished right away, and then this method of Dr. Barnes' should be taught them. The brushing of the teeth according to this method doubtless will improve the mouths, but I believe we should remove the filth from those mouths as rapidly as possible, and I believe we will get better results than if we wait for those conditions to come about solely by brushing.

Dr. W. G. Ebersole, Cleveland: The paper just presented is one of the most important that has been brought to the profession in recent years, and deals with the things that the general public needs most. It is thoroughly scientific, practical, and the methods described are thoroughly efficient. It is not the exploitation of any brush, and nothing is connected with it in any way that is commercial It is a method or system of producing oral cleanliness. This paper means much to us as dentists, if we take it and study it and master the methods and principle it teaches; but it is wholly impossible for us to take the paper and study it as suggested, even after his clinic. It is impossible for us to take it up and study it in that way and make the greatest use of it. We must learn the methods at the hands of some one who has been instructed thoroughly along these lines and is capable of making the correct application of them, or you will not be qualified to make use of the teachings of this paper in instructing your patients. Dr. Barnes has *understated* the importance of this rather than overstated it.

A correct understanding of the principle laid down and the proper application of methods described in the paper will do more good and be of greater benefit to humanity in general, than all that ever has been written relative to dentistry I make that statement with due respect for all those who have written and with a full realization of the great value of that which has been written relative to dentistry. I make the statement because this paper presents the safest and sanest artificial means of producing and maintaining oral cleanliness and oral health. Such artificial means of producing oral cleanliness is made necessary by the fact that artificial methods of living and the artificial methods of preparing and grinding of foods, have produced great impairment or complete loss of nature's own method of procuring and maintaining oral cleanliness and oral health.

Nature in her simplicity and purity needs no tooth brush or any other artificial means of producing oral cleanliness. Mankind has violated or infringed upon nature's laws and substituted the artificial for the natural so often and frequently, that artificial means must be supplied to do for us what outraged and handicapped nature cannot longer do. Mankind having lost nature's method of serving and maintaining oral cleanliness, demands that the dental profession supply that need in the most scientific and practical way. Dr Barnes makes it possible for us to supply that great need. I have been closely in touch with his work, have seen his patients, have watched his progress from the time he started until the present, and in the light of what I have seen and have come to know, I want to say most emphatically that we, as members of the dental profession must take up this kind of work and give it to our patients or we fail to do our duty to humanity. We are inclined to, and most of us do, look for cavities in the teeth, and finding them, immediately proceed to fill them, and do not instruct our patients how to take care of their mouths until all else is done; and then, in our hurry, at the last moment usually, only half do it or fail to mention it at all. It is our first duty to instruct them as to the care of the mouth; and they should be made to feel that this is the most important duty of the dentist and that they are charged just as much for that instruction as for any other service rendered. We should not be tooth fillers, but tooth preservers, and mouth preservers. That is our mission.

In my office the usual practice is precisely reversed. The first thing that we impress upon a patient is that the greatest and the most important service we can render is, to thoroughly instruct in the principle and methods of procuring and maintaining oral health, and then the securing of such application of these principles and methods as shall prevent tooth decay. The patient is made to feel that any other service which we may render stands subordinate to this and is only a means to that end. If the patient is one who has been very neglectful of his mouth, he is told frankly that unless he can master and will continually practice the method of producing oral cleanliness, it will mean a waste of his time and money and that I will not be a party to the crime. I adhere strictly to that stand. I will not work for people who will not take care of their mouths.

I have had dentists tell me and have heard the same comment here while Dr. Barnes has been presenting this paper; "I can't get my patients to do those things." Of course you can't and you never will so long as it is the last thing you mention, and is mentioned at a time when the patient is all through with other work and feels that everything is all fixed in good shape now, and he need not see you again for months and perhaps years, and what you say simply goes in one ear and out the other. But turn the thing the other way round. Give your oral health talk first, and at a time when the patient is most interested, and then as you do the other work needed you will have an opportunity to supplement your talk by pointing out any failure on the part of the patient. At the first appointment take the time necessary to give thorough instruction and as often thereafter as is necessary; and take the time to re-instruct in following the technic, pointing out in the mouth, the places where the patient has failed in the application of the technic. In this way you have frequent opportunities to impress the patient with the importance of oral cleanliness and make him feel that you have his true interest at heart; and you will find the time thus spent has been well worth while, both as to the degree of respect shown you and the results obtained by your efforts. Making a full charge for the time thus employed, and impressing this fact upon the mind of the patient both strengthens your position and secures greater co-operation upon the part of the patient.

Dr. Barnes, you have given us a great paper and a wonderful demonstration; and I want to express my deepest gratitude for the privilege extended to me, and to say that every dentist who will take up and successfully follow your teachings will not only render a great service to his patient but will live to feel deeply grateful to you.

Dr. O. H. Reisser, Cleveland: Is this tooth brush on the market? Can we prescribe it?

Dr. Kelly, M.D., Cleveland: I am a surgeon dealing specially with children, but since hearing Dr. Hayden, I am a little proud that I have been doing a little more than the doctor says some of the dentists have been doing to teach people to keep their teeth clean. So important have I regarded it for many years for the general health, as well as in regard to infectious diseases, diseases of digestion and nutrition, and in the preparation of patients for operations on the palate, mouth, and throat, that it is a part of the routine examination to look into the condition of the teeth, and that has led me to observe particularly. Of late years I have been teaching them this method, following Dr. Barnes' work along, of cleansing their teeth in a better way than they have been doing it. Ask a child who has had any teaching at all how they clean them, and they usually demonstrate or say the rotary, or they show in what way they have been taught, and it is by those old methods. Many, of course, have had no instruction at all, and I have found it convenient to tell them "When you combed your hair, did you not forget to comb your teeth?" This phrase seems to catch their attention, and by a little demonstration of how it is done, with the fingers on the face, they catch the first idea.

Dr. Barnes says that is not quite right, that the bristles are held a little too horizontal; but these little shavers do not shave, and they do not catch the idea so quickly until they get the idea of the comb. Then they can slant the bristles after that, and very soon fall into the way of doing it.

The Humane Society hasn't anything on me in this as to experimenting on animals before I gave it to the children. I experimented on myself under Dr. Barnes' instructions, and I found it very good for me. Between my own personal observations and what I have seen with the children, I am satisfied it is the best way to keep the teeth clean, and is as easy as any other. When you see it in action and do not hear it in words, it is a very simple thing. If you see it done, anybody with a little instruction can do it. This has done a great deal for me personally and for my patients.

Dr. E. B. Lodge, Cleveland: While we smile at the words "squeegee" and "swiggle," perhaps I can elucidate them a little "Squeegee" is borrowed from photography, and means to the photographer the process of laying a number of wet prints which have been washed, one upon the other, and then taking a little roller of rubber and pressing upon them to squeeze out the water. If that is the case, the analogy we have here is the motion of the brush so directed that the filth is systematically and scientifically ejected from the pockets.

(Note—Webster's New International Dictionary gives these definitions: "Squeegee—(noun). A device with a handle and a transverse piece at one end * * * used for drying decks, windows, pavements, etc., by squeezing (or pushing) off the surplus water; hence, a smaller, similar piece, used by photographers, lithographers, and others for squeezing off surplus moisture, etc." And, as a transitive verb—"To smoothe, press or treat with a squeegee." I consider that Dr. Barnes has brought two good words into general use that were in danger of becoming obsolete—G. E. H.)

As to the word "swiggle," I think that is perfectly proper, inasmuch as, like many of our words, the sound of the word as in dabble, frizzle, and frazzle, suggests the operation.

Dr. Varney E. Barnes, Cleveland: I was given some of this advanced tooth-brush instruction in 1902. My father then found that by faulty brushing I was causing a recession of gums on my lower bicuspid teeth, and called my attention to it, and showed me how the damage was done. A change in brush manipulation stopped the recession and it seems to have progressed no farther to date.

I always have been a little backward about accepting all of the brushing methods advocated by my father, but I found, as his brush grew smaller and smaller, that I could accept more and more of his teachings. Finally I took up his plan and tried to adopt it, believing I was doing the brushing as he had instructed. I thought I was going through the method correctly, but I was not for I had muscle tension, which interfered with the proper brush manipulation. This was discovered when my father watched me and found my masticatory muscles were on tension. I was holding my mouth open *instead of allowing my teeth to close with relaxed muscles.*

You should be able to handle the brush very limply; for example, put brush in the mouth, and talk, and as you talk you will find that brush handle will be pulled out of its line and out of action. However, talking does not produce as much muscular tension as a thorough opening of the mouth would, still, that is enough to prevent proper brushing. *You must have complete relaxation of those muscles to get the real effect.* If you have tension on the muscles, you cannot put the brush high on the gums, and cannot brush without irritating the gums. We want a pressure that is stimulating and cleansing, not irritating. We must develop that technic by the sense of touch—and cannot do it on another person successfully. *It must be taught*, and *you must teach the method*, having the patient try in your presence, go home and put the method into practice and then *return to you for another trial in your presence.* Then you may note the errors, correct them, and have the patient try and try again, until the method is thoroughly learned and applied.

The squeegee action mentioned is where the tissue goe ahead of, or is put into motion ahead of the brush, and that stimulates the gums and forces the debris out of the gingival margins and crevices onto surfaces where the bristles can pick it up and carry it away.

Since using the brushing methods advocated by the essayist, I have had no bleeding of gums, and my teeth have been kept far cleaner without dentifrices than they formerly were with them, all of which speaks highly for the methods advocated and which I, therefore, can endorse enthusiastically.

Dr. Henry Barnes: (Closing) To Dr Hayden's objections I may state that the paper does not condemn the prophylactic specialist, but it does offer a method whereby the patient may co-operate and with greater satisfaction. Prophylaxis means prevention treatment. Therefore, the patient should be taught the best known method in order that he may conserve the tissues, and, when this is done the specialist and the dentist will be relieved from performing those operations now made necessary by the limitations of present practices.

It is a great mistake to infer that the patient will not co-operate in his efforts to cleanse his teeth, and thus give that assistance so necessary to the dentist in his efforts to prevent disease of the hard and soft tissue. We have in the past instructed them and they have co-operated to the best of their understanding and to their own harm. These instructions have been honestly given but nevertheless faulty. When they understand that the method as given in the paper will, if faithfully followed, produce positive good results, the co-operation of the great majority is assured.

To Dr. Kenyon's statement that the small brush will require a longer time in brushing to cleanse than will a large brush, I offer the results in the experience of the past five years to prove that this is an erroneous statement. One sweep of the small brush, using the new method, over the soft and hard tissues will cleanse a greater surface area than many brushings of the large brush, using the older methods, because, the bristles of the small brush in their downward thrust enter the approximal spaces and dislodge the food particles which never are touched otherwise. The large brush gives a superficial cleansing, while the small one is more efficient. Exception also is taken to the superficial scaling and later the deeper penetration. The pockets about the teeth in pyorrhea cases are filled with a mass of filth, and if this is first removed by the method as given in this paper, the soft tissues quickly respond in the direction of health, when thoroughness in scaling may be resorted to. No surgeon, with mind full of his reputation, cuts into diseased tissues, and we should so far as possible follow this wise course.

Dr. Lodge has given good definitions of the terms "swiggle" and "squeegee." Dr. Ebersole has stated the case as it has appeared to him, and he has had an excellent opportunity to know of the results obtained. Dr. Varney Barnes is using the method for his little patients to aid in orthodontic work and is obtaining results as satisfactory as are my own.

Dr. Kelley's contribution coming as it does from the surgeon, is gratifying and shows the growing sentiment in favor of mouth care, as relative to health, on the part of our sister medical profession.

I cannot close this discussion without a final word. Within the past two weeks a prominent health authority has advised through the public press that several stiff brushes be bought and to insure stiff bristles, hung up to dry; and that these stiff brushes be used to scrub vigorously brushing up and down, being careful not to injure the gingivae. How is it possible to use stiff brushes, to brush vigorously up and down and not to injure this soft and delicate gum tissue? Vigorous brushing and stiff brushes have been so long advocated that we have come to believe these things necessary, whereas, soft bristles and gentle massage is now advised with results surprising in the extreme. Answering the question as to where brushes may be obtained, I can only say that all my brushes to date have been made by myself, modified from brushes purchased in the open market This I should advise you to do, until brushes can be supplied in market quantities The best brushes are made from bristles obtained from Russia and China, and these owing to the war, are not being gathered as formerly. Added to this the brush factories of England are prohibited by law from entering upon any new work during the progress of the war.

I thank you all for your kind attention and consideration.

Discoloration of Facings

Frequently a beautiful piece of crown or bridge work, when long pin facings have been employed, becomes unsatisfactory because the facings have become discolored. This is usually due to organic deposits between the facing and its backing because the latter is not well adapted to the former. To overcome this the backing should be swaged to the facing by means of one of the many swaging devices now on the market, rather than burnishing the metal as was formerly done.—*Pacific Dental Gazette.*

EXPLANATION OF X-RAYS AND READING OF RADIOGRAPHS*

BY J. P. HENAHAN, D.D.S., CLEVELAND, OHIO.

THE X-RAY was accidently discovered in the year 1895 by Professor Roentgen in whose honor it is called the Roentgen Ray.

Figure 1. X-rays are the result of the passage of an electrical current of high voltage from the negative to the positive pole across the gap of a separated circuit.

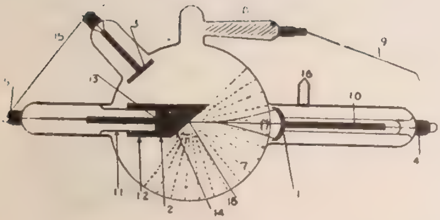


Fig. 1

Fig. 2

Both poles of this separated circuit are contained within a tube of special construction from which the atmosphere has been pumped to some extent but not completely in any case.

The penetration power of X-rays depends upon the velocity of the current which strikes the target.

The velocity of the current in turn depends upon the voltage of current applied to terminals of the tube and also the degree of vacuum in the tube.

The current for exciting the X-ray tube is produced by any one of four types of X-ray machine.

First: (*Figure* 2.) The static or original type of X-ray machine, seldom used now for the reason that more efficient and less expensive types are to be had. It generates 200,000 volts, with only two and one-half to five milliamperes.

Second: (*Figure* 3.) The Tesla or high frequency coil. This type is of value where portability is desired. The outfit may be carried in a box the size and shape of a suit case. It generates 60,000 volts, with one to two milliamperes.

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*Given as a descriptive clinic, Northern Ohio Dental Society, 1916.

Third: (*Figure* 4.) The induction or Rumkorf coil. This has been and perhaps is still the most commonly used type of X-ray machine. It generates upon the average 160,000 volts with ten to thirty milliamperes. This type gives very satisfactory results in minor radiography, but is being superseded by the most modern development in X-ray machines which is the:

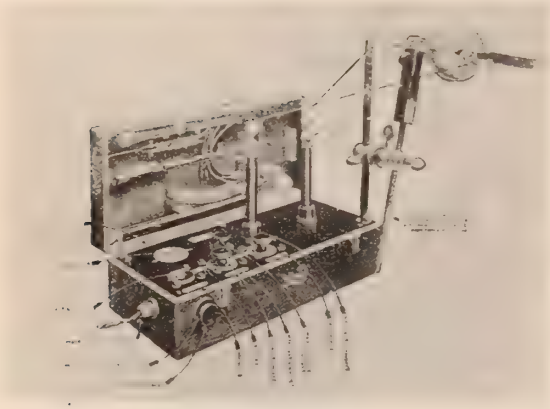

Fig. 3

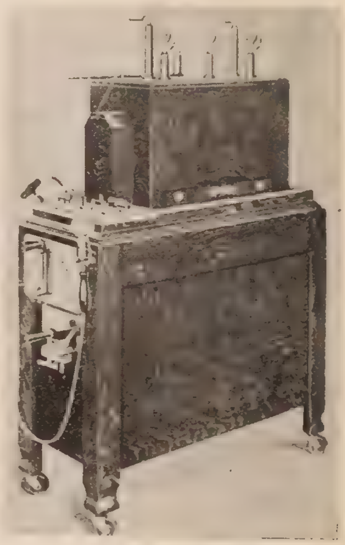

Fig. 4

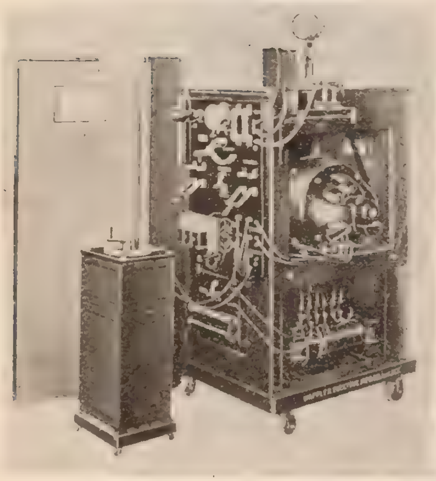

Fig. 5

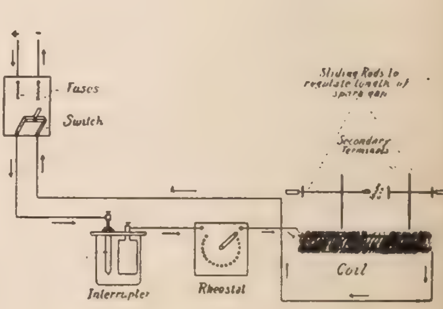

Fig. 6

Fourth: (*Figure* 5.) Interrupterless transformer, which is much more powerful and will do much faster work. This type of machine generates about 110,000 volts and thirty to one hundred milliamperes.

The first two machines will not be considered for want of time.

The induction coil is a step-up transformer which changes the voltage of the electric light current from one hundred and ten or two hundred and twenty up to 60,000 to 200,000 volts.

The amperage is reduced from fifty amperes and is measured in milliamperes.

Figure 6. The installed apparatus consists of a switch from the supply current, an interrupter, a rheostat and the coil.

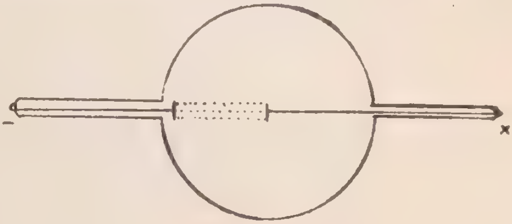

Fig. 8

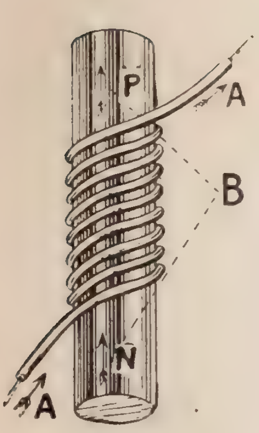

Fig. 7

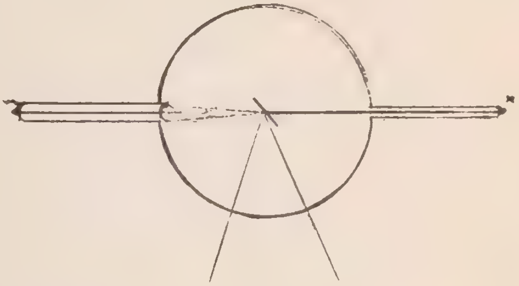

Fig. 9

The construction and operation of a coil is understood by many but I will take a minute to explain it here.

Figure 7. The coil consists of a bar or bundle of soft iron to be the core and which becomes a strong electro magnet, active only while the electric current runs through it. (Hard steel is not used because it becomes a permanent magnet and would not answer for this purpose.)

Around this core is wrapped about one hundred feet of coarse insulated copper wire which will be known as the primary winding. This in turn is thoroughly insulated and about this insulating is wound twenty-eight or thirty miles of fine insulated copper wire. This is known as the secondary winding. The two systems have absolutely no metallic connection with each other.

When an electric current is turned into the primary winding another current is induced in the secondary winding due to magnetic influence of core and is a secondary current. It persists only for the shortest instant.

When the current is discontinued another current is set up which is much stronger than the current induced at make, it travels in the opposite direction and is the current employed to produce the X-ray.

To make this high voltage available for X-ray work it is necessary to arrange the primary current so that it is made and broken very often. For that purpose an instrument known as an electrolytic interrupter is placed in the primary circuit.

(See *Figure* 6.) It consists of a platinum point enclosed in a porcelain sheath, all but the point, the whole being immersed in a bath of water and twenty per cent. sulphuric acid. As the current passes through the platinum and sulphuric acid, a chemical action takes place and a bubble forms around the point breaking the current. This effect takes place about 30,000 times a minute.

It may be controlled to suit the requirements of the tube and the supply of feed current and controls the secondary voltage and amperage.

As only a unidirectional current is satisfactory for the production of X-rays, a special arrangement is made by the different manufacturers to prevent the current from entering the tube from both directions. The current at *break* is stronger than at *make* and it only is strong enough to overcome the resistance in the tube. Also tubes known as valve tubes are made for this purpose. The other current is known as inverse current and unless it is eliminated from the tube it causes fogging of pictures.

Coils are rated as 8–10 18 inch coils not from their physical size but according to the number of inches of atmosphere their secondary current will jump.

(See *Figure* 5.) The transformer or interrupterless coil is the most recently perfected X-ray machine. It consists of a rotary converter, a step-up transformer and rectifier switch.

This type of machine is built for either direct or alternating current supply. Its power is rated not by the length of its spark gap but by its electro motive power and is designated as one, two, four or ten kilowatt as the case may be.

X-rays are invisible vibratory rays of light of or in the ether. The theory concerning them is that they are light waves in an inconceivably rapid rate of vibration. The comparison of X-ray light with other lights is as follows: Red light waves vibrate at the rate of four hundred billion per second. Violet rays, seven hundred and fifty billion per second. Blue, green, orange and yellow at figures between these two. Ultra-violet rays vibrate faster than violet rays and X-rays or tri-ultra violet rays still faster, the rate being estimated at two hundred eighty-eight quadrillions, two hundred forty-four trillions per second.

X-rays exert a profound affect upon living animal cells and if too frequently applied may be destructive. Therefore certain measures must always be resorted to for the protection of both patient and operator.

TUBES

Figure 8. The long extension on the tube is to prevent the current from jumping without passing through the inside of the tube as it might if the terminals were nearer to each other.

This explains the development of X-ray tube and production of X-rays.

If the cathode were a flat disk facing a flat surface target the current would be given off from a million points and there would be a million focus points upon the target, the X-rays would be given off from that many points and the picture would be hazy and without sharp contrast.

Figure 9. To overcome this the cathode is made concave and the cathode stream is caused to converge to a single point of contact. The target is faced at an angle of forty-five degrees and this throws the X-rays off at right angles to the onrushing electric supply.

(See *Figure* 1.) X-ray tube. Shows in diagram a modern X-ray tube for use with a coil or transformer. The diagram explains itself.

According to the law of penetration the shorter the ray the greater the penetration. It is therefore desirable in X-ray work that to a certain extent we produce a sufficient volume of short rays.

Tubes which generate X-rays are designated as hard, medium and soft. A hard tube is exhausted to one millionth of an atmosphere, a medium to one hundred thousandth, and a soft to one thousandth of an atmosphere.

A complete vacuum is impossible to attain.

The medium tube is the kind employed to produce the best result in dental radiography. The harder the tube, the shorter and more penetrating the rays will be and the greater will be the velocity of the electricity and rays passing through the tube.

In low vacuum tubes the illumination inside the tube is greater according to the extent of the existing vacuum. This illumination is not X-rays but fluorescence of the rarefied gas remaining in the tube.

In medium and low tubes the rays given off are longer but greater in volume. Their power of penetration is not as great but there are more of them.

The current passes through a low or soft tube at the estimated speed of 124 miles per second, through a medium at 128 miles and through a hard tube at a still faster rate.

It means that a higher potential current is forcing itself through a tube the harder the tube happens to be.

COMPARISON OF VALUE OF HARD AND MEDIUM TUBES IN X-RAY PICTURE WORK

HARD:

- Less volume of X-rays generated.
- Rays are more penetrating.
- These rays produce less contrast in black and white in picture work.

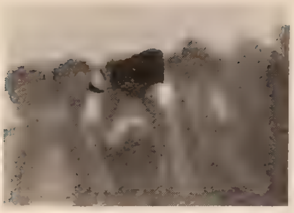

Fig. 10

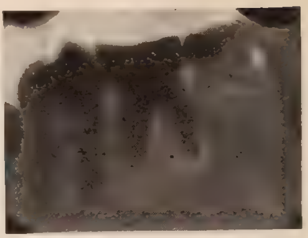

Fig. 11

Fig. 12

Fig. 13

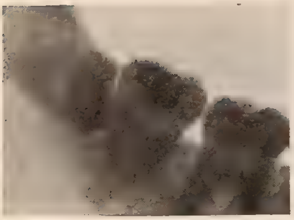

Fig. 14

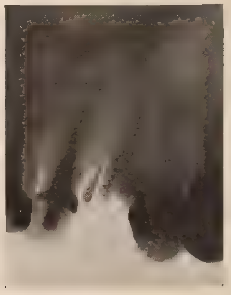

Fig. 15

Fig. 16

Fig. 17

More exposure necessary than in lower tubes because of lack of volume of rays.

Milliamperage of secondary current is low.

Not as much danger of X-ray burns because rays pass through instead of being absorbed by superficial tissues.

MEDIUM:

Greater volume of X-rays.

Less penetrating X-rays.

More contrast between blacks and whites in radiograph.

Less exposure needed than in hard tube because of volume of rays of suitable character for dental radiography.

Milliamperage in secondary current greater than in hard tube.

More danger of X-ray burns for reason that rays are more likely to be absorbed by soft superficial tissues.

Higher milliamperage sent through tube the more X-rays are given off and shorter exposure is necessary.

Harder tubes are used on an induction coil than upon an interrupterless machine because of the necessity for the tube being hard enough to resist the passage of inverse current. There is no inverse current to contend with in the interrupterless machine.

Special designs are necessary in tubes used with static and high frequency machines.

DANGERS

Continued exposure to the influence of the X-ray may result in any of the following conditions:

Superficial effect upon the skin resembling a bad case of sunburn.

Falling out of hair.

Pigmentation of skin.

Cracking of finger nails.

In bad burns, even falling off of nails.

These burns are very hard to treat and are very slow in healing.

The effects are primary and secondary.

The Primary effects develop shortly after exposure and appear in any of the various stages of Roentgen Dermatitis.

The secondary may not manifest themselves for years but are usually far more devastating in their affects.

These cases occur only where the operator repeatedly exposes himself to the rays.

This was the case with many of the early experimenters. It is not necessary today for the reason that perfect protection is to be had for the operator.

It has been found that the X-rays will not pass through lead even in very thin sheets or even through other substances impregnated with salts of lead. Therefore, we find today that we are supplied by the manufacturers with various devices such as lead screens, lead salt glass which appears as clear as any other plate glass, is made up into shields which enclose the tube and afford openings for passage of rays.

Windows and glass screens also are made of this material.

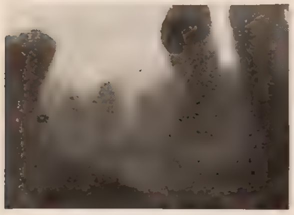

Fig. 18

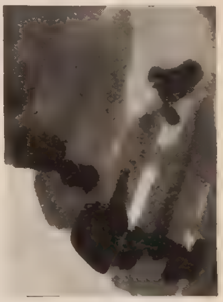

Fig. 19

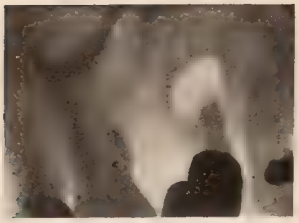

Fig. 20

Fig. 21

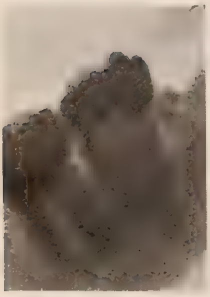

Fig. 22

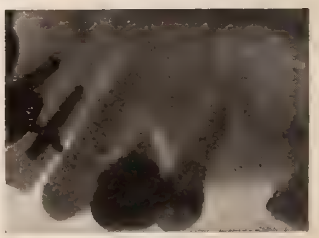

Fig. 23

The use of the radiograph in dentistry is divided into four stages by Dr. Raper:

First—When you did not use the radiograph at all not realizing what help it might give.

Second—Stage of enthusiasm when it was expected of the radiograph to tell everything every time.

Third—Disappointment stage in which the radiograph is considered worse than nothing.

Fourth—The common sense stage in which the radiograph is taken for its worth, making allowance for its limitations.

The following are only a few of the ways in which the X-ray may be of use to the dentist:

Figure 10. Shows second bicuspid retarded in eruption by second deciduous molar.

Figure 11. Search for source of an abscess.

Picture shows suspected impacted second bicuspid not present.

Unerupted third molar.

Abscess formation upon both roots of six year molar, as well as a broken instrument in distal root.

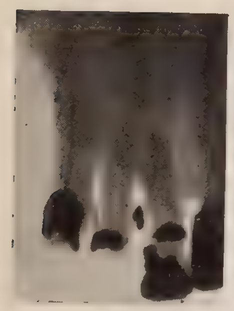

Fig. 24

Fig. 25

Figure 12. Permanant teeth erupting in natural order.

Figure 13. Permanant superior cuspid retarded in eruption for lack of space in arch.

Notice effect of force upon lateral root.

Figure 14. Impacted lower third molar.

Figure 15. Showing split cuspid root.

Effects of abscess of teeth.

Figure 16. Showing chronic abscess on roots of six year molar.

Partial destruction of bone supporting tooth.

Figure 17. Resorption of root of replanted tooth.

Figure 18. Search for continued pain long after extraction.

Shows sequestrum being exfoliated.

Figure. 19. Extensive destruction of bone; filling material forced through apex.

Figure 20. Chronic apical abscess without inflammatory condition of bone.

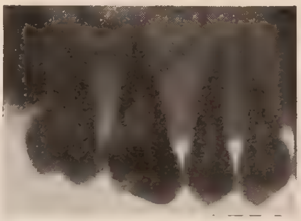

Fig. 26

Figure 21. Apical abscess showing osteitis.

Figure 22. Foreign body cause of continued pain.

Figure 23. Resorption of root.

Might be mistaken for abscess on second biscuspid.

It is anterior part of antrum.

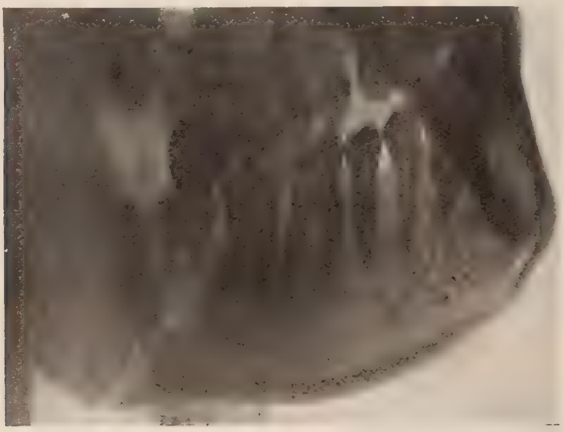

Fig. 27

POSSIBLE MISTAKES IN READING

Figure 24. Incisive foramen and canal sometimes diagnosed as abscess formation.

Figure 25. Mental foramen, same mistake.

Figure 26. Pulp stone.

This is due to position necessary for making shadow.

Figure 27. Shows fracture at angle of ramus.

1019 Rose Buildg.

PREVENTION OF DENTAL CARIES*

A CONSIDERATION OF SOME PHASES OF THE ETIOLOGY OF THE CONDITION AND THEIR RELATIONSHIP TO THE ESTABLISHMENT OF DAILY ROUTINE PREVENTIVE MEASURES.

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IN REVIEWING the literature of the profession for the past few years one is overwhelmed with the mass of data bearing on the causes and treatment of caries of the teeth. More treatises have been written, more scientific research work has been inaugurated, and more hypotheses have been advanced on the subject in the past decade than have been brought forth along any line in the entire realm of dentistry. The searcher after truth, if he attempt to keep abreast of the modern trend of thought in this connection, is indeed soon lost in a stormy sea of conjecture, doubt and misgiving, unless he is a very persistent student.

It is the purpose of this paper to discuss more or less briefly some features in regard to the etiology of the morbid condition, together with their bearing on the measures which would seem to be rationally expedient in their application for its prevention, in order that we may arrive at the establishment of a definite basis, from which the dental practitioner may formulate a daily routine course of procedure for his patients to follow. In this discussion we shall endeavor to establish, as near as it is possible at the present stage of progress, the essential causes which concern us in arriving at the conclusions to be hereinafter made. If we can first discover the true cause of a condition, the application of a suitable remedy for its relief is, as a rule, a comparatively simple matter.

Regardless of the mass of work which has been done along this line, we will be compelled to admit that the unraveling of the mystery of dental caries is still far from accomplishment. At the same time, some small advances have been made along certain definite lines since the scientific labors of W. D. Miller, with the result that by picking up and weaving together a thread here and there, we may truly feel that the light of better things is beginning to shine upon us. The difficulties relating to the working out of the unsolved problems of dental caries are largely those of physical and physiological chemistry. Many phases of the question lie wrapped in the study of the physics and chemistry of the organic colloids and the crystalloids. All living matter is composed of colloidal and crystalloidal material, and an extensive parallelism exists between the laws which govern the reactions of these substances *in vitro* and in the living organism.

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*Read before the Tennessee State Dental Society, June, 1916.

At the same time, many theories and hypotheses which have been worked out in the laboratory do not successfully stand the test of clinical experience. This is due to the fact that the laboratory experiments are a study of lifeless matter. For a complete understanding of the living, we must work out many phases of our reactions on living matter. Whatever progress is made, however, there always remains an unsolved portion, the kernel, as it were, of vital phenomena. In the words of a great physiologist: "Life can perhaps be better understood only through life itself."

EXTERNAL AND INTERNAL FACTORS

It is a self-evident fact that caries must be due to causes arising either outside or within the teeth, or both. The available evidence at our disposal strongly points to the conclusion that it is due in most instances to a combination of both internal and external factors. The *external* factors relate in quite a degree to the local environment of the teeth themselves, but the state of the secretions of the oral cavity in which these organs are bathed is largely regulated by systemic conditions. The *internal* factors concern more especially those relating to the nutrition and structure of the enamel and dentin.

HEREDITY, CIVILIZATION AND DIET AS GENERAL PREDISPOSING CAUSES

Prominent among the general predisposing causes of caries are mentioned (1) Heredity, (2) Civilization, and (3) Improper dietary. The question of *Heredity* as an important causative factor has been largely discussed of late. At this time it is of interest because it is now claimed that caries is not in itself a disease, but is a morbid state, a pathologic condition, as well as a symptom of general physical deterioration. Carl Rose is authority for the statement that: "Decay is not a disease in itself, but a symptom of general physical degeneration, the gauge to human health." Regarded in the light of the present development of biological science, decline of the teeth must be ascribed not to degenerative tendencies, but to panmixia. By panmixia is meant the discontinuance of selection with an organ or a characteristic quality, with the result that an individual possessing this organ or quality to a greater degree than the average or normal condition is not favored with reference to duration of life or reproduction above the individual in whom they are defectively developed. A study of statistics frequently indicates certain associations between the quality of the teeth, the hair, the eyes and other organs, as well as such conditions as cleft palate. This is attributed to the inheritance of variants, a study of which is now occupying the attention of many biologists.

Prominent among the numerous causes of the disorder which may be grouped under the general heading of *Civilization* is that of increased brain-work, which leads to an accentuation of the activity of the thyroid glands.

It is conceded that stimulation of the secretory functions of these glands leads to increased elimination, or improper assimilation of calcium, and finally results in diminution of the alkalinity of the saliva. The question of the bearing of disorders of the endocrine glands on the production of caries has been discussed by the writer in a former paper, which appeared in the September 1915 issue of the *American Dentist*, and it is not within the province of this communication to enter again into that question, except to remind my hearers of the bearing of disturbances of this nature on calcium metabolism, as well as on the glycogenic content of the saliva.

A discussion of *Dietetics* in their causative relationship to the condition would be beyond the limits of this paper; however, I desire to touch on a few points in this connection. Edward C. Kirk has emphasized the fact that excessive consumption of certain carbohydrates may lead to faulty metabolism of these products in the liver and the production of an excess of fermentable glycogen in the saliva, with consequent increased susceptibility to caries. Numerous writers have brought out the fact that excessive sugar consumption results in an increased production of mucin in the oral secretions, thus facilitating the localization of food masses and the formation of bacterial plaques.

Another essential consideration in connection with the question of diet is the importance of including sufficient lime-containing foods in the dietary: The organism requires a large daily supply of calcium, in order that the metabolic processes of the body may be carried on properly. Deficient lime consumption, as a result of lack of it in certain carbohydrates and proteins, results not only in deficient tooth and bone formation, but in a softening of these tissues after they are fully formed, since metabolic processes are taking place here at all times. Bungé, of Basel, and Sherman, of Columbia University both agree that half of the civilized world is suffering from lime starvation. Since the body loses in the excreta about 13½ grains of lime daily, it is evident that this must be replaced through the consumption of lime-containing articles of diet.

A phase of the subject of diet in its bearing on caries production, on which too little stress has been laid, is that of its influence on the general condition of the lower bowel. A preponderance of protein foods frequently has a tendency to lead to intestinal stasis and constipation, with resultant toxemia and lowered bodily vigor; whereas there is a lessened tendency in this direction with the carbohydrate foods. This has an important bearing on the susceptibility of the individual to caries of the teeth, not only through its effect on the general health of the patient, thus leading to lowered resistance of the teeth, but through its influence on the condition of the saliva itself. I cannot better emphasize what I wish to say in this connection than by quoting from a recent communication of J. H. Kellogg, who says:

"In the writer's opinion, it is just as important for the conservation of the teeth to keep the colon clean and free from masses of stagnating and putrefying food remnants as to brush and cleanse the teeth. The colon is a most efficient incubator, and when the dominant flora is proteolytic in character, stasis will necessarily give rise to the production of such enormous quantities of putrefactive products that the poison-destroying ability of the liver, kidneys, thyroid, suprarenal capsules and other structures is overtaxed and the tissues are flooded with such quantities of toxic material that the alexins and the enzymes of the blood, which normally afford ample protection through inhibiting the growth of bacteria, become inoperative. The salivary and mucous secretions of the mouth become deteriorated, deficient in germ-destroying and inhibiting elements, so the fluids with which the teeth are bathed do not protect them, but rather furnish favorable nutrient media for the development of destructive organisms, which are thus permitted to form in colonies on the gums or the teeth and carry on their destructive work. It is quite as important that the patient should be taught how to make his bowels move efficiently three or four times a day as to instruct him in the use of the tooth brush and other mouth-cleansing measures."

With much of the above I am in agreement, although the proposition in regard to the inhibitory function of the saliva on the growth of bacteria still remains to be worked out. It would seem that the parotid saliva does have this effect on certain staphylococci and streptococci.

It is now seen that the subject of a proper diet is very large and one which should receive increasing attention. A study of its relationship to susceptibility to dental caries will reveal the fact that we do not have to deal merely with the question of the establishment of a balanced ratio of proteins and carbohydrates on a calorimetric basis, but that we also have to deal with the question of a tolerance on the part of the patient for these classes of foods, in order that we may establish, as nearly as possible, a normal nutritive balance for each individual.

VITAL RESISTANCE OF TOOTH STRUCTURE

In a consideration of the factors of inheritance, civilization and diet in this connection, their causative influence depends to quite a degree on the importance of the bearing of the proposition of the vital resistance of tooth structure against the attacking agencies. Many modern investigators now agree that vital enamel and dentin are subject to metabolic processes throughout the life of the individual, and are enabled to resist the inroads of pathologic attacking agents in the same manner in which all vital tissues of the organism resist them. Prominent among those who refute the validity of vital or biologic phenomena in the teeth in their causal relationship to caries is Hermann Prinz. When the supply of alkali in the blood is deficient in such diseases as rickets, osteomalachia, gout, and diabetes, the organism always invades the hard structures, such as the bones and teeth, and takes away their contained alkali. This is accomplished through the fact that ammonium chlorid is formed in the blood in these conditions, which, although not an acid, acts as such, invades these hard tissues and produces a dissolution or softening of them; thus a predisposition to the action of the acids and bacteria of the mouth is created, resulting in an acceleration of the progress of caries.

Dr. Prinz always has assumed that vital phenomena in the teeth are not concerned in the production of caries. He simply states this as a fact, thus disputing the ground taken by other authorities, but since he has never proven his position, we will have to again assume that he is in error and repeat the position we always have maintained, viz., *Vital enamel and dentin are both capable of carrying on matabolic processes, and are concerned in the question of partial and complete immunity to dental caries, through the interposition of the vital element against the inroads of pathological processes attacking them.* It is true that enamel, owing to its small amount of colloidal content, is not as subject to constructive and destructive metamorphoses as dentin, and does not offer the same degree of vital resistance that this tissue does. At the same time it *is* concerned, and its influence always will have to be taken into consideration.

I trust that enough stress has been laid on these systemic predisposing causes to emphasize the importance of their causative relationship to caries production, and the necessity for their regulation as far as possible in formulating a schedule for the establishment of daily preventive measures.

LOCAL PREDISPOSING AND EXCITING CAUSES

The carious process may be divided into two characteristic phases, viz.,

First—*Penetrative Fermentation;* viz., a dissolution of the inorganic salts of the enamel and dentin through the action of lactic and other organic acids, which result from the fermentation of carbohydrates by the oral micro-organisms.

Second—*Disintegrative Putrefaction;* viz., a destruction of the organic colloidal material, the proteins, through the action of putrefactive bacteria. The changes incident to this putrefactive process are the same as those occurring in the putrefaction of all albuminous substances (which contain the elements C,H,O,N and S in their molecule), resulting in the ultimate formation of such end products as CO_2, NH_3, H_2S, H_2O, $HC_2H_3O_2$ and other interesting combinations.

The enamel, owing to its small amount of colloidal constituents, is destroyed largely through fermentative processes, but, as will be understood readily, the putrefactive process is a large factor in the disintegration of dentin, owing to the presence of a large amount of albuminous material in the tubules, as well as in the matrix. The above agencies, then, may be considered the exciting causes of the carious process. These exciting causes are controlled to a degree by the general predisposing causes already mentioned, and through them by very important *local predisposing causes.* These may be grouped conveniently under the general heading of (1) defective structure of the enamel and dentin, (2) irregularities of the teeth, and (3) vitiated or deficient oral secretions.

That such defects as faulty union of enamel in pits and fissures, cracks in or fractures of the enamel, hypoplasia of the enamel and dentin, and imperfect deposition in these tissues of calcium during the formative periods increase the susceptibility to the carious process, is well understood and needs only casual mention. The influence of irregularities, abnormal interproximal spaces and imperfectly constructed contact points is also well recognized. This being the case, they will not be mentioned further. We are at present concerned with the question of the influence of the fluids in which the teeth are bathed, the local environment, as etiologic factors.

As already mentioned in the discussion of the influence of diet on the condition, an excess of glycogen or of mucin in the saliva, as a result of faults in the dietary, is to be avoided, since the one is likely to influence the fermentation process, while the other will accelerate the agglutination of food masses and the formation of bacterial plaques on the teeth.

CHARACTERISTICS OF HUMAN SALIVA

Normal mixed saliva is a watery solution, weakly alkaline in reaction, containing principally alkalies, mucin, CO_2 and amylase (ptyalin), together with such other less important constituents as maltose, oxydase, catalase and potassium sulphocyanate. Its normal rate of secretion is about 1 cc. per minute. The function of sulphocyanate in the saliva never has been determined satisfactorily. The presence of the alkaline constituents serves to neutralize to some extent the acids of fermentation, while the amylase is of importance in the hydrolysis of starches, the other ferments mentioned being also concerned in the digestive process. There has been considerable discussion of late on the bearing of the amylolitic function of ptyalin on the production of caries. Although its influence is claimed to be negative by such investigators as Prinz and C. Lovatt Evans, the probability of its action as an etiologic factor is conceded by many other authorities, prominent among whom are Pickerell and Michel. The principal physiological purpose of the mucin is to protect the mucous membrane against the action of irritants and to render an easy passage for the food bolus during deglutition.

The principal functions of normal healthy saliva are as follows, viz.:

1. To biologically inhibit the action of certain oral micro-organisms.
2. To help neutralize the acids of the mouth.
3. To transform starch into maltose.
4. To mechanically wash away food debris.

It may be considered as nature's mouth wash, and a fairly good one unless it is a product of contaminated blood. The degree of alkalinity of the saliva is regulated to some extent by the rapidity of the flow, as well as by systemic factors, viz., the greater the flow the higher the alkalinity. The amount of salivary secretion is regulated largely by (1) the psychic and mental state of the individual, (2) the amount of water taken into the system (3) the degree and manner of mastication and (4) the character of foods and other substances taken into the mouth. The first of these agencies, which has been mentioned previously, does not further concern us here. The others are of extreme importance. Since all of the watery secretions of the body are augmented by an increase in the amount of liquids in the dietary, it is but natural that the salivary secretion may be accelerated in this manner, The drinking of hard water, rich in calcium salts, will increase the alkalinity of the saliva as well as its flow. It is hardly necessary to call your attention to the well-known increase of the salivary flow through the vigorous use of the teeth in mastication. There should be included in the dietary plenty of hard, dry food, since this not only enlarges the necessity for increased mastication, but also stimulates the flow of saliva.

STUDY OF DENTIFRICES

If it were possible to accomplish a physiological cleansing of the oral cavity at all times through a freely-flowing, healthy, alkaline saliva and proper mastication of suitable foods, caries of the teeth would rarely occur. Since this is manifestly impossible, owing to our present methods of living, it is necessary to assist nature in her efforts by the adoption of artificial measures.

Your essayist called the attention of the profession a number of years ago, in an article which appeared in The Dental Summary, to the fact that many of the lower animals are accustomed to the adoption of artificial cleansing measures in the mouth, through the action of the muscles of the lips, cheeks and tongue. The cleansing operation may be accomplished fairly well in this manner by the human being, in the absence of the brush.

I have been engaged recently in a comparative study of the relative value of alkaline and acid mouth-preparations, as a result of which I am prepared to change any former views I may have held in regard to the advisability of acid mouth washes, as advocated by Gies and Pickerell. In the first place, I have found it impossible to persuade patients to continue their use, on account of their disagreeable taste and the increased inconvenience of obtaining and applying them. The public, as a whole, never will acquire the habit, even if we, as a profession, continue to recommend them. In addition to this, there are several other very important disadvantages connected with their use, which render them inadvisable.

The mucous membrane of the average mouth is usually in a mild state of inflammation as a result of the daily contact of hot substances in the dietary, and other irritants, such as tobacco. This should receive attention in the application of any daily hygienic measures. Acid preparations in the strength recommended still further irritate the condition. In addition, these acids will undoubtedly destroy the action of the digestive ferments already mentioned as normal and important constituents of the oral fluids, as well as have a tendency to produce over-stimulation of the salivary and mucous glands, finally resulting in a disturbance of function. Another objection to their use is the fact that they have very little, if any, medicinal or detergent effect in themselves, with the result that they have to be used in combination with mechanically cleansing powders or pastes, all of which are alkaline in reaction on account of their alkali base—a procedure which is irrational. These facts being apparent, I feel that acid preparations of this nature are a failure.

At the same time, most of the proprietary dentifrices on the market today have some objectional qualities. Prominent among these are (1) the presence of too much soap, which on account of its alkalinity destroys the digestive ferments, and (2) the incorporation of artificial coloring matter, to improve the appearance and increase the sale of the article. Mouth washes should be clear solutions, and powders and pastes should be as nearly white as possible, to prevent discoloration of tooth structure.

Regardless of the work which was done in this connection a number of years ago by the writer, dentists continue to recommend colored dentifrices to their patients, notwithstanding the undoubted harm which they do. Although the presence of numerous other detrimental components in some of the widely advertised oral preparations is recognized, dental practitioners are still allowing their patients to use them.

Lime water and physiologic solution of sodium chlorid have been recommended in the past by various authorities as mouth washes, the latter on account of its well-known antiseptic effect, and the former on account of its alkaline reaction. These preparations, although they both possess undoubted advantageous properties, never have come into general use, and never will on account of their disagreeable taste.

PROPERTIES OF AN IDEAL DENTIFRICE

A dentifrice should possess the following qualities, viz.:

1. It should be cleansing in action.
2. It should be of pleasant taste.
3. It should be colorless.
4. It should be non-caustic to the soft tissues.
5. It should be mechanically and chemically non-abrasive to the enamel.
6. It should be non-poisonous to the organism as a whole.
7. It should be non-inhibitive on the secretion of saliva.
8. It should be non-destructive to the salivary ferments.
9. It should be very slightly alkaline in reaction.

It will be perceived that there are very few, if any preparations on the market which possess all of these qualifications. Those most nearly approaching them should be prescribed.

There has been quite a good deal of discussion of late as to the most efficient manner of maintaining the tooth brush in a sterile condition. The method advocated by Dr. Hugh MacMillan is by far the best and simplest which has come to my notice, and consists of sprinkling a liberal supply of table salt on the bristles after the mouth-toilet is complete, allowing it to remain until the brush is ready for use again, when it may readily be washed off if desired. Thus all bacterial life on the brush is inhibited during the interim.

ROUTINE PREVENTIVE MEASURES

The following schedule, which is largely based on the points discussed in the body of this paper, would seem, at the present stage of our knowledge, to be a rational daily routine course of procedure to be recommended:

A Daily Schedule

1. *General hygienic measures.* Maintenance of good health and bodily vigor through regular exercise, abundance of sunshine, fresh air, baths and similar measures. Avoidance of intestinal stasis, toxemia and similar conditions.

2. *Diet.* Daily and regular consumption of an abundance of *hard* water. Regulation of the protein and carbohydrate constituents of the dietary according to the needs of the individual. Daily intake of a sufficient quantity of lime-containing foods. Inclusion of acid fruits in the dietary, especially at the beginning or end of a meal.

3. *"Fletcherizing."* Sufficient mastication of adequate quantities of coarse, dry foods.

4. *Toilet of the mouth.*
    (*a*) Absolute and continuous cleanliness of the mouth through the systematic institution of an oral prophylactic regimen, by means of the brush, tooth pick, floss silk and similar measures.
    (*b*) Keep the tooth brush sterile by freely sprinkling it immediately after use with common table salt, which is allowed to remain until the next cleansing operation.
    (*c*) Regular and frequent use of a colorless powder or paste, containing as nearly as possible the additional ideal characteristics previously mentioned—this to be used in conjunction with, or followed by, a colorless, mildly antiseptic, antiphlogistic, slightly alkaline wash.

DISCUSSION

Dr. D. M. Cattell, Memphis: I read the doctor's paper at midnight Friday night. I read a part of it again this afternoon after luncheon, and then I had another gentleman finish reading it to me, and in the meantime I went to sleep. So all I can do, gentlemen, with his paper, is to emphasize every word, every sentence, and every paragraph that there is in it. The other night when I read it over, I had a pencil and whenever a good paragraph came I pulled it along down one side, and I kept doing that until the whole thing is covered with marginal lines, meaning take particular notice, and if I should emphasize everything I would like to, it would be but reading the paper to you over again. There is nothing to criticize; it is all to commend. In a discussion of it we might bring in a few other points, but in doing that it would only spoil the good points that he has made. However, there are a few places that I would like to doubly emphasize and bring to your mind again that you may remember them a little more clearly. He says: "It is a self-evident fact that caries must be due to causes arising either outside or within the teeth, or both." The first expression that we had of caries was away back yonder in 1530, and in that writing the author refers to an earlier writer; but in the rough there it is as we generally have it today, that it was outside influence, that it was on account of conditions surrounding the tooth, there was something there acting upon the tooth, that decay progressed. After that a hundred or two hundred or three hundred years, it was supposed by some that the decay or the breaking down of the tooth began from within, and operated a little like a boil, so to speak, and it finally burst out. Then later our better students determined that it did not come from within the tooth, but wholly from without. Later again it was determined that the enamel was but a coat of mail, so to speak, over the tooth proper; that when the enamel was deposited and the organ depositing it had finished its work, there was no further connection with that scale or "coat of mail" and the blood system, or with any condition that would tend to renew its life or maintain its life, that it was done; it was simply a covering, a mechanical coat of mail. That theory has been held so long, that caries had nothing to do with the tooth, or rather the other way, that the tooth had nothing to do with caries, any more than a barrel of cider had to do with its souring; that it was something that soured the cider, it was something that soured the jam or preserves, and it was not inherent within the preserve itself; that is, the cause of decay was not inherent in the tooth, but must come from without.

Now it seems to me as though there is a new thought coming in. But it will not do for us, just because "Pap said so" that we must believe it. I have been a stickler for the older idea; however, here comes our friend McGehee, and he says it is otherwise. We must take what the new man says some times, although it is entirely against our inclination. I am not yet ready to lay down and give it up and say that such things may be, that the enamel of the tooth after it is fully formed, in adult life, has any active resisting power within itself. I am not ready to believe, although I am ready to listen—it may be proved later. If it is so, it will be as much of an upsetting of present understanding of conditions as it was in 1891 when Dr. G. V. Black said there was no such thing as a *hard* tooth and a *soft* tooth. We all believed there were up to that time the hard and the soft tooth. But he explained it to us so fully that there was but three-tenths of one per cent. difference between a tooth eleven years old and a tooth sixty-four years old, and that the expression, hardness and softness of a tooth, could not be maintained. And so we had to change right there, and maybe we will have to do it again, or will be forced to do it when these great research laboratories that are at work throughout the country teach us new things. He says, in his opinion it is just as important for the conservation of the teeth to keep the colon clean and free from masses of stagnating and putrefying food remnants as to brush and cleanse the teeth. I want to emphasize that. It is a new way of expressing an old thought, but I do believe it is true. We have at one end of the alimentary canal control of the first three or three and one-half inches. I might say full control. But the most poisonous conditions exist at the other end of the canal, and no matter how well we may maintain proper hygienic conditions at one end, if we leave the other end alone it will come back largely, and offset the good influence that we have over the three or three and one-half inches at the beginning. I know men that have been ill for years who with a little careful attention to what the doctor has suggested here have become well and enjoyed life.

He says again: "It is now seen that the subject of a proper diet is very large and one which should receive increasing attention. A study of its relationship to susceptibility to dental caries will reveal the fact that we do not have to deal merely with the question of the establishment of a balanced ratio of porteins and carbohydrates on a calorimetric basis, but that we also have to deal with the question of a tolerance on the part of the patient for these classes of foods, in order that we may establish, as nearly as possible, a normal nutritive balance for each individual."

That is something new. Heretofore we have said that certain classes of foods were good for mankind. Now, as I understand it, certain classes of food are only good for certain men, while other classes are just as good and proper for some other individuals. What is good for the goose is not always good for the gander, see? It seems strange to me that so little along these lines has been thought out in the last few years for men—I mean, mankind. Here a few months ago a great wave went over Tennessee and adjoining states, started by the agriculturists, and they went into each community and talked in every school house and every hamlet that they could get an audience; they called in the medical profession and the dental profession to go along with them, and we went. We had a good time. We told them some things that we thought they ought to know. They sat still and listened. And all the talk of some of those men, or a majority of it, was to balance food for cows and hogs, and they had it down to a fine point. A certain breed of hogs should have so much of this kind of food, so much of that, and so much of the other every day, and another breed of hogs should have it some other way; and the same with the cattle. Mankind has not known anything about that. We haven't thought that it would be of any account to us. They have been doing more for our domestic animals in the world of science in the last ten or fifteen years than they have been doing for mankind. And so now the time has come for us to take the question up of something to eat.

Dr. D. P. Houston, Chattanooga: I want to congratulate our association and Dr. McGehee for giving us such a splendid paper. It is a very scientific study, on a very interesting and important question. That is our main field—the question of dental caries. I received a few days ago a synopsis of this paper, and if you will permit me I want to call attention to some things which have not been mentioned.

The question of ductless glands is something we have been reading about the last two or three years. I do not know much about it, but I really believe it has something to do with the formation and the resistance of the teeth, as well as the other parts of the body. Just in what way I am not prepared to say, but it is something which will be looked into more in the future, I am sure.

We do not balance our food properly, and that of course has a bad effect. I think the main thing is the question of diet, and, as Dr. Cattell has remarked, we should devote more time to mankind and perhaps less to cattle and hogs.

There are one or two things about which I would like to make some inquiry. He does not recommend a mouth wash, but he says we should eat acid foods at the end of a meal. I would like to ask whether mouth washes cause any difference in the flow of saliva and in the nature of that saliva; that is, whether an alkaline dentifrice would have an effect on the quantity of the saliva produced, and also whether or not the different kinds of foods, carbohydrates, proteins, etc., have any effect on the quantity and reaction of saliva produced. I ask this because I know a lady who always finishes a meal with a piece of meat or piece of cheese, " to take the sweet out of the mouth," as she says, and I think in doing that the saliva is not as thick. One other thing I wish to speak of is tobacco. We all know that people use it, and I wish that it might be explained more fully, from a scientific standpoint, the effects produced in the mouths of users.

Dr. Robert S. Henry, Chattanooga: A subject which is a very interesting one, and on which I think every dentist should be more familiar, is that of the intelligent use of dentifrices. On one occasion I read a paper before a dental society, and I found that very few dentists were able to discuss dentifrices, although we are called upon many times a day to prescribe a dentifrice or mouth wash. I find that many dentists are prescribing mouth washes and dentifrices without knowing their composition, their action, etc.

I want to congratulate this essayist, who has done a great deal of very good work, and his reference to the saliva probably having some effect on the bacterial growth in the mouth made me curious to ask the question: What about sulphocyanate of potassium? but later he says the function of it has not been determined. If I remember, Pickerell and one or two other writers have given the function of sulphocyanate of potassium as probably preventing caries. I would like to hear from the gentleman as to his opinion on the work of Pickerell in reference to the effect of sulphocyanate of potassium.

Dr. Henry W. Morgan, Nashville: I do not arise to discuss the paper, as I do not feel that I am competent to do so, but to congratulate Dr. McGehee on the extensive amount of study and time that he has put upon the subject and the beautiful way in which he has presented it. The subject of caries is always interesting as are the other subjects that he has touched upon collaterally, in presenting the paper. The association is to be congratulated, and it is to be hoped that we will all have the opportunity hereafter of giving the paper a careful study.

I recognize his embarrassment in attempting to define caries. Since I began first to think about the matter at all, I have been endeavoring to secure a definition for caries, and there was a time when we sought the aid of such men as Drs. Jonathan Taft, W. H. Atkinson, J. E. Andrews, of Boston, and Frank Abbott, of New York, but without obtaining from them much help. I formulated then, and many of you may have heard me use the definition, one of my own, that it is a "chemico-vital-parasitic disease" involving the wasting of the tooth tissue. I think when we come to study caries with this definition in our minds we will readily recognize that we have here, as we have in all other diseases depending upon a specific bacteria for origin, a necessary lowering of the vitality of the tissue upon which the disease acts before we can fully comprehend what the disease means. This is exemplified very strongly in those cases where we find caries following a long serious spell of typhoid fever. Certainly there is a characteristic action of caries here that enables those familiar with it to at once diagnose that the cavity had been preceded by the illness. I would again congratulate Dr. McGehee upon what he says in reference to mouth-washes and tooth-powders. I have read with a great deal of interest his article in which he so intelligently and scientifically demonstrated the fact that colored preparations should not be prescribed. Just one or two thoughts here. A tooth-wash or a tooth-powder should be as intelligently prescribed for a patient and the condition in hand as you prescribe medicines for diseases. There is no such thing as an established tooth-wash or tooth-powder. The conditions confronting us must be met, and not simply a prescription for a favorite mouth-wash or tooth-powder. Again, there should be no prolonged use of either of these articles, the tissues tire of them—the tissues of the mouth become inured to their use and they become worthless after a while; as much so as the tissues of the body do to drugs, in case of persons having the drug habit.

One other thought in which I wish to agree again with Dr. McGehee, and that is with reference to the use of a sufficient amount of water, and the use of hard foods, as he says, coarse foods; but in preference to coarse food, in most instances, if I wish to excite the salivary secretion, I would prefer some food that is pleasant and agreeable to my patient. I believe we get the same physiological effect, the same stimulation to the salivary duct, from the chewing of food that is pleasant and agreeable to us as we do from food that is hard or coarse and tasteless. I think we lose more than one-half the benefit of mastication and the stimulation from the salivary glands, when we fail to use those things that are pleasant and agreeable to us, because this same stimulation is reflected throughout the digestive tract, and every organ that is at all interested in digestion is stimulated by the pleasant and agreeable stimulants through the gustatory nerves, and they are just as active as the salivary glands, and thus such foods have a bearing upon the secretions, advance digestion and assimilation, and promote the general health of the individual.

Dr. B. H. Johnson, Nashville: I am not competent to discuss Dr. McGehee's paper, but I do want to say that caries is one of the bitterest enemies we have to fight, and we not only have to fight it ourselves, but we must teach our patients and the people we come in contact with how to fight this disease. It is a subject that we ought to study, and when I hear a paper like this it makes me feel that I would like to have about three year's study and instruction on this one subject. I think we can do a great deal of good even though we do not know very much about it from a scientific standpoint. If we set the example before the people, as he has indicated here in the paper, such as Fletcherizing, and taking care of our own conditions, and, as Dr. Cattell has said in his response, take care of the whole alimentary tract and live a life that will help fight off, not only caries, but all other diseases, that example would be worth more to the people who watch us than it would be for someone else to do this, because every physician and every dentist is being watched every day. He may not know it, but grown people are just like children; they follow in their footsteps, and the things they see us do have more weight with them than the words we speak. You know there is a saying that our actions speak so loud they cannot hear what we say.

As to foods, I appreciate that we cannot set any certain diet for any certain people. Everyone has to work out his own diet. There are a few things that affect all people in much the same way, such as taking strong stimulants which are bad to take into one's system. And so here, too, if we guard against those things and do without them, and make some sacrifices along that line in our own appetites and inclinations, we can have a great deal of influence on those who watch us and do a great deal in fighting caries.

Dr. J. L. Austin, Chattanooga: I am not capable of discussing the paper, but Dr. Cattell brought out a point relative to foods. I do not believe that everybody should be advised to eat the same thing. I think the guinea and the razor-back should be fed differently. I believe each individual should work out his own food. I do not think that we should give quite the advice we do to a great many of our patients. We tell our patients, don't take a drink of anything but coca-cola, and be sure that you do not chew tobacco; don't do this, and don't do that. And yet some of us are invalids, or semi-invalids, ourselves. I think your patient probably knows better how to work out his own salvation, if he has average intelligence, with a little help, than he would if you do not put so many things in his head. I think if you leave out more of the dietary, and that he must do this and that, he would be better off. Teach him to eat wholesome food, do what he likes, and be moderate, but don't try to make an angel of a man. I think that would help a good deal. In other words, you will have more influence over your patient. Be considerate. Take into consideration whether the patient will take your advice or not.

Dr. McGehee: (Closing). I do not believe that our friend, Dr. Cattell, is entirely prepared to accept this hypothesis in regard to the vital resistance of tooth structure against the inroads of pathological processes. I think his remarks in that connection would indicate that he was trying to be as lenient as possible with us, as a matter of friendship. It is a point, which, as I mentioned in my paper, is being discussed pro and con by numerous investigators throughout the profession. It seems to me that there are certain things in that connection which I would like to bring out more fully in order to emphasize my position.

In the first place, in regard to the presence of the vital element in the dentin—you know that during certain pathologic processes, such as caries, the dentinal fibrillae will deposit additional quantities of calcium salt. An excellent example of this is the presence of the transparent zone of Tomes, which is frequently found underlying the layers of decay in the dentin, and which is an effort on the part of nature to resist the further inroads of this process. Other familiar examples are seen in the presence of tubular calcification under abraded and eroded areas. Dr. Morgan brought out the point that during such conditions as typhoid fever, pregnancy and other diseases which might be mentioned, the teeth are more prone to decay. Investigators in the past have told us that this is due to the fact that, during the progress of these diseases, care of the mouth is neglected, and it is natural for decay to occur more rapidly under those circumstances. That attitude in connection with the matter is taken by men who are opposed to the vital theory in regard to resistance in the teeth against disease processes. We now know, however, since increased attention has been given to prophylactic work in the mouth in hospitals, by physicians and dentists in general, that many of these cases of typhoid fever, pregnancy and similar conditions are receiving daily oral hygienic attention, and yet notwithstanding this, they are still markedly subject to the ravages of decay. How do we account for that, then, in any other way except through acknowledgment of the fact that the resistance of these tissues is lowered together with those of other parts of the body?

Now, in regard to the resistance of enamel—as I brought out in my paper, there is very little organic matter in the enamel, and we have to admit that this tissue cannot possibly be as subject to constructive and destructive changes as the dentin. At the same time, there is some organic material present there, and even this tissue is, in my belief, capable of some degree of vital resistance. The presence of channels in the enamel has been demonstrated, these channels running from the surface throughout the substance of this tissue to the surface of the dentin. Dr. Theodore von Beust has demonstrated the presence of these nutritional channels, and in an article which he wrote in the *Dental Cosmos* several years ago he showed some very pretty photo-micrographs demonstrating their presence. In the paper which I wrote on the study of colored dentifrices, which Dr. Morgan mentioned, and which was read before the National Dental Association a number of years ago, I demonstrated the fact that enamel may be stained throughout its substance from within outward or from without inward by certain coloring agents. That together with the work of Dr. von Beust, to my mind absolutely demonstrates the presence of these nutritional channels in the enamel, which would account for a certain amount of resistance of this tissue against the ravages of disease.

I brought out in my paper a point in regard to the manner in which retrogressive changes take place in the teeth in such conditions as rickets and diseases of that kind, through the presence of calcium chlorid in the blood, which acts as an acid and produces these disintegrating changes from within.

In regard to the subject of diet, some of you have agreed with me as to the importance of increased study of the relationship of diet to the diseases with which we, as dentists, have to deal. The question of diet is largely concerned, not only in the prevention of caries, but it is also concerned in the prevention of pyorrhea alveolaris. It seems to me, then, that it is very important that we, as physicians of the mouth, should make it our duty to look after the diet of our patients, not necessarily laying down for them strict rules as to just what they should and should not eat at every meal, but going into the matter and inquiring as to what character of food they most need under certain circumstances. Very briefly, we might say that the protein foods consist of such articles of diet as the meats, milk, eggs, leguminous fruits and vegetables, such as peas, beans and lentils; that the carbohydrate foods consist of such articles as bread, macaroni, potatoes, fruits and sugars or sweets. Substances which contain large amounts of lime are, for instance, eggs, the blood of meats, wheat and certain vegetables. Now it is important, in trying to lay down a proper dietary for a patient, to establish that dietary on a basis which will, as nearly as possible, agree with the needs of the individual patient, as has already been brought out; for instance, we may find that certain meats will disagree with certain patients, while various other meats these patients can digest very nicely. The same way with certain vegetables, and so we have to be careful in recommending various articles of diet. It would seem that we should recommend a combination of protein, carbohydrates and lime-containing foods, together with the proper amount of fats, if the digestive apparatus will take care of the fatty foods.

In regard to the question with reference to the sulphocyanates, Dr. Lowe, of Buffalo, first called the attention of the profession to the importance of the presence of sulphocyanates in the saliva, and he claimed that they had some antiseptic effect. The matter was largely discussed pro and con in the journals for a number of years. A study of the question was finally taken up by Dr. Gies, of Columbia University, who published a series of articles in the *Journal of the Allied Dental Societies*, which pretty thoroughly established the fact that the sulphocyanates have no antiseptic action in the saliva. This is very good reading, and I would strongly recommend these articles to those who are interested in the matter. Just what effect the presence of sulphocyanate has on the general system, and through it, on the teeth, we do not as yet know. There are investigations still going on along this line, and that is about as far as I can enlighten you at this time. I myself am at present engaged in a further investigation of this subject.

In regard to the influence of certain classes of foods on the saliva, I would say that it is well known that acid fruits stimulate the functions of the salivary glands, in that way increasing the flow of saliva. It is also claimed that strongly alkaline preparations have the effect of hindering the flow of saliva. At the same time, according to Kirk and other investigators, such substances as lime water and dilute alkalis have practically the same effect as acids, that is, they stimulate and increase the flow of saliva, and this is one reason why some of these authorities recommend the use of lime water as a wash, but, as I have already brought out, lime water has an extremely disagreeable taste to many people. Personally, I object to it very strongly, and I do not believe it ever will come into general use. The use of an acid fruit at the beginning or end of a meal, occasionally, will have the effect of stimulating the flow of the salivary glands, and finally increasing the alkalinity of the saliva. At the same time, if the use of these fruits is carried to an extreme it will undoubtedly have a deleterious effect.

In reply to the question with reference to tobacco, I desire to say that the comparative absence of caries seen in the mouth of individuals accustomed to chewing the weed was formerly attributed to the presence of some antiseptic principle contained in the tobacco. It is claimed at the present time, however, that this is an error, and that tobacco has a stimulating effect, through the presence of nicotine, on the functions of the salivary glands, in that way increasing the flow of saliva, thus reducing the tendency to decay.

I believe that I have covered, as far as I can remember, the points which I was asked to bring out. I wish to thank you very much for your kind attention, and for your very lenient criticism of my paper. It has been a great pleasure to me to be present with you. (Applause)

SOME PHASES OF PERIAPICAL INFECTION*

BY ROBERT M. TEMPLE, D.D.S., COLUMBUS, OHIO.

SINCE HUNTER, in 1910, directed the attention of the profession to the etiologic relation of septic areas about the teeth to systemic disease, and since our own research commission, as well as other investigators, have confirmed this relation, many of our operations heretofore performed on a basis of trust and hope must now be viewed and met from an entirely different standpoint. I refer particularly to those operations which, if done in a careless manner, may produce foci of infection about the teeth, and which in turn may produce many grave systemic disorders. Under this classification may be placed operations directed to the devitalization, extirpation, and replacement by a suitable material of the dental pulp, as well as all other operations which may be productive of gingival inflammation. In harmony with this new attitude, is the imperative demand that gingival inflammation be early recognized and the causes eradicated.

That we may clearly understand the different phases through which any tissue may pass from health to disease and the resumption of its proper function, a knowledge of the histology, pathology, and physiological activities must be known. That we may have more concise information relative to the histology of the principal tissues concerned in periapical infection, I will quote from Grieves, who, paraphrasing largely from Noyes, says: "Cementum and pericementum, attaching the tooth to the alveolar walls, are developed and formed according to age and particularly use." As the tooth erupts, there is but one layer of cementum, i. e., the primary circumferential lamellæ, laid down against Tomes' granular layer at the expense of the thickness of the future pericementum. This layer contains microscopic fibers, but is otherwise an apparently homogeneous calcified structure, so there can be no known communication from the pulp, via. the dentinal tubules and the lacunæ and canaliculi to the peridental membrane in the dentin region. Lamina after lamina is added. These are deposited among the fibers of the pericementum, attaching the same (by the way, the only means by which they can be attached), by a modified connective tissue cell, the cementoblast, which presides over this deposition and finally becomes enclosed in matrix substances, producing the lacunæ with their processes, the canaliculi. Of these there are not so many as in subperiosteal bone formation, but the whole procedure is very like it, as Hopewell-Smith ("Pathology and Patho-Histology of the Mouth and Teeth") observes, minus the number of penetrating vessels, "The cementum becomes gradually thicker in the middle third, and is thickest in the apical third", so that the apex of every adult tooth is completed in vital and *growing* cementum, containing many lacunae and canaliculi, if not vessels—a much more open structure free to the flow of tissue juices than that covering the remainder of the root. Noyes says: "From a study of the lamellæ, therefore, it is apparent that the entire root is clothed in successive layers, and that these layers are formed intermittently, but they continue to be formed as long as the tooth is in position". And again, "This occurs whether it contains a vital pulp or not", provided no infection has occurred.

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*Read before the Northern Ohio Dental Society, 1916.

With this understanding of the tissues most intimately concerned in periapical infection, we will turn to the etiological factors involved.

Generally speaking, periapical infection occurs subsequent only to the death of the pulp, inflammation resulting in most cases from infection introduced through the pulp canal. This may occur without the aid of the dentist, more often it is the result of his lack of aseptic methods, long continued medication or the use of medicaments too high in oxygenating power, creating an area of lowered resistance subject to infection, not only through the pulp canal, but in some instances from the blood stream as well.

The organism most prevalent in periapical infection is the streptococci.

An analysis of the etiology of periapical infection discloses the fact that the dentist is a large factor in its production. To substantiate this claim it is only necessary to call attention to the almost universal lack of asepsis in the procedures incident to the removal of the pulp and attempts to fill the root canal—to the failure to remove the tangible remnants of pulp tissue, which furnish pabulum for the micro-organisms present or introduced, as well as the failure to fill the canal to or nearly to the apex, which even though the pulp be all removed, permits the infiltration of tissue-juices which become infected from the unsterile canal; the use of so-called antiseptic pastes which do not long inhibit bacterial action, together with the use of medicaments which often not only are destructive to the periapical tissues, but to their reparative powers as well.

So then, the prophylactic phase of the subject requires a consideration of that most difficult of all dental operations, the removal of the dental pulp and its replacement with an adequate root-canal filling. That this can be beautifully done, theoretically at least, all will agree. That you have been doing it well is evidenced, in your mind at least, by the few cases of trouble of which you are aware or of which your patients complain. Personally, the experience of more than a year gained through the making and study of radiographs, both of my own and referred cases, has removed my bump of conceit.

That the operation is difficult and the fact that many canals can not be filled to the apex, regardless of the dogmatic assertions of some operators, should not deter us from our best efforts. The radiograph will show if we have failed, (and that is the only means of positively knowing), and if so, we can try again, often with success.

Statistics covering some thousands of radiographs clearly indicate that less than twenty per cent. of these canals are well or even fairly well filled under present conditions. That a large percentage of these failures produce abnormal apical conditions of which the patient is unaware, many of which are producing or may at any time produce grave systemic conditions, cannot be denied, and should be sufficient incentive for us to redouble our efforts. That periapical infection does not follow all of these failures is due to efforts of nature rather than the dentist, we will later attempt to show. It is evident, then, that our operations leading to the periapical area should be conducted more in harmony with surgical principles, which look to the conservation of all normal tissue, knowing full well that unnecessary destruction of tissue creates larger areas of lowered resistance more liable to infection, necessitating greater reparative efforts. To that end, also, surgical asepsis is of primary importance in all root-canal operations. I say this advisedly, even in face of our preconceived notions as to its necessity or practicability, for we are invading an area which, if infected, in the light of our present knowledge, we know may eventually result as disastrously for the patient as where infection takes place in a major surgical operation, although this may not be so soon apparent. That surgical asepsis is practicable and not necessarily burdensome in its details, has been clearly shown by Best. ("The Responsibility of the Dentist in the Event of Pulpless Teeth", *Items of Interest*, July, 1915). Elbert Hubbard once remarked, "The man who says it cannot be done, in this day and age, is often interrupted by the man who does it." A full discussion of this phase of the subject would add greatly to the length of this paper. However, the time is coming when asepsis will be absolutely demanded. My advice that you read Best's article will, I hope, be sufficient.

The procedure incident to the removal of the pulp should be carried out in such a manner as to conserve and not destroy the periapical tissues. "That every particle of the pulp which can be removed by the finest instrumentation and technic should be removed, regardless of the time consumed, goes without saying", yet, Grieves points out that: "The rather recent and what might be termed too officious surgical procedure in this area is to be deplored," referring to the practice of intentional perforation under the manipulation of the broach, and certain chemicals, "for the simple reason that it is not possible even with the help of a radiograph, in the majority of adults, to look into a canal and to follow all of its ramifications and then on out intelligently into the pericementum". "Some sort of a perforation can always surely be made, a gold wire passed and a radiograph taken—but is this the real vessel opening? Have we not added another chance for damage and infection of the surrounding tissues, and after all left the old one still containing a part of the pulp? If there are other vessel openings at angles to the main canal, how are we going to excavate and fill any of these when we can not determine their presence with a radiograph or sense of touch? Again, what is the idea in perforation anyway? Presumably that every particle of pulp tissue be removed".

Personally, I feel that we are not justified in operating in this field unintelligently, and with determination to produce some tangible results, regardless of what they may be. Hence, when it comes to a question of deliberate puncture that all vital pulp be removed, Greives most aptly remarks: "It would be better to spend the time in conversation, and to stop just short of it, to remove the pulp to but not through the apex, and particularly not to run the risk of infecting this area, and then allow the cells to resorb and care for the small tissue left". * * * * * * "Repair in this region depends", quoting Noyes, "Upon the fact that the cells must reach and resorb the defective area and lie in physiological contact with it. A new attachment of tissue can be produced in no other way." "This is quite possible concerning the organized clot and pulp shreds which are lying just at the immediate foraminal opening, but this condition must be sharply differentiated from tangible pulp shreds left deep in the apical third."

The question of the proper methods and material to use in filling root canals is one open to much discussion; a consideration therefore of the requirements are in order.

First of all, it should be a stable compound, not subject to physical change, nor to alteration by the action of tissue fluids. It should be compatible with the tissues. It should hermetically seal not only the larger foramina but the dentinal tubules as well. It should be non-shrinkable, or if any shrinkage take place, it should be in the center of the mass and not away from the walls of the canals, Its introduction to the apex should not be difficult and its removal with ease should be possible.

A material which to my mind most nearly meets all of these requirements is found in that introduced by Dr. J. R. Callahan, consisting of a solution of rosin in chloroform, which when placed in the canal acts as a solvent for gutta-percha canal points. Theoretically, at least, you are all acquainted with the technic required, so I will not discuss it further.

The use of so-called "antiseptic pastes" is generally condemned; while they apparently answer the requirements for a while, they soon lose their antiseptic properties, absorbing tissue fluids which become infected from the unsealed and unsterile dentinal tubules, often resulting in tissue necrosis.

Another problem in filling canals relates to the question as to how far the filling should extend, whether just to, in, or through the canal opening. To my mind, where no tissue has been destroyed about the immediate vessel opening, the filling should reach just to or into the opening and not through, because there is no possibility of encapsulating the apex without inflaming and displacing the adjacent tissue, thus creating an area of lowered resistance with its possible sequallæ. While the limit to which the filling may go is not possible of definite control, yet its attempt seems more rational than trying to force it beyond the apex regardless of conditions.

Explanation for the attempt to encapsulate the apex is, I believe, based on the hope of thus protecting the adjacent tissues from necrotic areas as well as to thoroughly close the main foraminal opening. That the foramina are generally multiple, and that gutta-percha will not adhere closely, if at all, to surfaces, which, as in this case, must be moist from tissue juices, as well as the fact that the area of necrosis would be difficult to determine and cover in its entirety, seems to have escaped consideration. Grieves says: "Perforation of this area by canal filling is only permissible in chronic alveolar abscess, to be followed immediately by curettment, or when apicoectomy is planned." Much more could be said regarding this subject, but I will leave it to be taken in discussion, if you so desire.

Generally, and until recently, we have not been called upon to diagnose periapical infection, except upon complaint from the patient, when in most cases the condition was apparent either through the appearance of a fistula or evident inflammation. The known relation of periapical infection to systemic diseases having been determined, we are now being called upon by the physician to establish the presence or absence of this condition in cases under suspicion.

To do this intelligently demands our greatest skill in diagnosis and discrimination, based upon a thorough knowledge of the physiology and pathology of the parts concerned. As a rule, little aid can be expected from the patient. A general survey of the mouth should be made and any pathologic condition other than periapical infection noted. A general history of the case, together with the history of any individual teeth, especially those to which dental attention has been given, should be obtained when possible.

Devitalized teeth, as well as all crowned teeth, place themselves under suspicion of periapical infection. Our one most positive means of identifying pulpless teeth is the reaction to the Faradic current: Palpation, illumination, percussion and the application of varying degrees of temperature, often reveal much information.

A tentative diagnosis having been made, a radiograph is then demanded, and this should include all crowned teeth, to prove, elaborate upon or disprove our tentative diagnosis or suspicions. A radiograph is simply a record of the resistance to the passage of the X-Rays by various tissues; it records faithfully the condition existing when intelligently applied.

Eisen says: "The correct interpretation of radiographs is dependent upon one or all of the following details: The angle at which it is taken; the amount of distortion; the correct time of exposure and development, and comparison of the radiographic and clinical findings." Even then their interpretation is subject to much dispute. Knowledge of the parts concerned and experience in reading radiographs are necessary, and are the only basis upon which sound conclusions can be reached. If the radiograph fails to reveal an abnormal condition it is due to the lack of appreciable tissue destruction; it is just here that keen discrimination and experience are most valuable. Much could be written on this subject alone.

As an accurate diagnosis is the basis of successful treatment, so is a knowledge of the histo-pathology of the tissue concerned necessary to that end. So, (recalling again the histology of the periapical cementum,) we are reminded of its highly cancellated character; its lacunae and canaliculi, and the multiple vessel openings passing through it to the pulp. This, together with the fact that the cementum, unlike subperiosteal bone, has of and in itself no power of reproduction when stripped over any considerable area of the pericemental fibers, is most important. The question, then, becomes one of how much tissue liquefaction has taken place and how long the apex has been bathed in pus. If once this cancellated structure is exposed to infection, it is most difficult to free it from it.

"If the fibers of the peridental membrane which penetrates the cementum be liquefied, and if the cemento-genetic or nutritive cell layer be raised for a period from its surfaces, if the dental pulp be suppurating or gangrenous, passing centrally through the periapical cementum on the one side, and if it be exposed to pus containing pyogenic-cocci on the other, with its nutriment supply doubly cut off, cemental necrosis and infection may be a matter of but a few hours; for even if the pus be evacuated and the periapical fibers readjust themselves, they are restored in *unattached* white fibers, and the nutrient vessels of course, never restored. The pathological picture then becomes that of a bone from which the periosteum has been raised on both sides, with no blood supply from the narrow cavity. In bone, such areas rapidly become necrotic and are finally sequestrated, when new bone is formed; not so the pericemental apex, for it is retained by the remainder of the pericemental membrane attaching the tooth, which may functionate perfectly while holding in situ a dead cemental apex."

Grieves,as well as Black, points out that the apex thus becomes necrotic in nearly every fistulous case and in all cases of blind abscesses, their opinion being based upon the examination of a large number of radiographs and microscopic specimens, confirming the death of the pericemental tissue.

It is evident, therefore, that processes of repair can take place in this area only through the deposition of a new layer of cementum, this being the only method by which the connective tissue fibers can be reattached; for this to take place, it is necessary that the tissues reach and resorb and lie in physiologic contact with the root surface, and the connective tissue cells must be actively functional. That this reattachment does not often occur is amply proven in many cases of apparently well-treated alveolar abscesses, which, upon exploration of the periapical area, revealed no reconstruction of bone, but did reveal the presence of the still necrotic apex. It is also evident that where repair did occur the necrotic area was extremely small and the result was due to processes of nature and not that of the dentist.

That there exist certain physiologic processes that care for the roots of many teeth, from which it has been impossible to remove all devitalized tissue or to fill the canal to the apex, is clearly demonstrated in the examination of many specimens and radiographs of buccal roots of upper molars and the mesial roots of lower molars, which, after many years, exhibit no necrotic areas, but, on the contrary, show evidences of increased deposits of cementum about the apical third; and, further, these deposits are not to be confused with hypercementosis, not being so great in extent. "These apical cemental deposits occur with such regularity as to be the normal biological procedure for closing this area against infection, as the patient becomes older and the teeth are more subject to pulp exposure." Grieves says that he is convinced that the foramina of every pulpless tooth, if not negligently left open or infected, but filled in or almost to the immediate opening, are, after all, closed and covered by a deposit of fibrous tissue, which later is often converted into an extra lamillæ of cementum. For proof of this contention, he points to the fact that the older layer can readily be distinguished from the new or secondary lamillæ, and that in some instances it completely closes and is deposited down into all the foramina.

This should not be taken to mean that careless operating in this field can be carried on with success, but does again re-emphasize the necessity for thorough removal of all tangible pulp shreds and the observation of complete asepsis in the operation.

While the last few paragraphs appear to be a slight digression from measures directed to the treatment of periapical infection, when established, yet, without any desire to lengthen this paper, I feel that without going into detail, it is my privilege to take a fling at the present-day methods of root-canal treatment. The tendency in modern surgery to abandon antiseptics in the treatment of wounds, on account of their interference with the physiological activities, should be noted. That most of the medicaments, as used in dentistry, are too high in production of tissue toxicity is amply proven by experiments made to determine the relative toxicity of different remedies.

The use, especially the prolonged use, of remedies too high in oxygenating power, will produce necrosis just as surely as will the presence of infection. This includes arsenic when unintelligently used in devitalization.

Therefore, taking into consideration the conditions as set forth relative to the state of the periapical tissues in the presence of infection and necrosis, and reminding you again that cemental necrosis occurs in nearly every fistulous and in all blind abscesses, it is clearly evident, that the remedy lies not in medication nor yet root-canal filling, but in the removal of the necrotic areas, that the tissues may be in physiological contact. To this end surgery is the only adequate remedy; our present knowledge of the ionization theory to the contrary notwithstanding.

For the removal, then, of the necrotic area we must rely upon apicoectomy or extraction. Apicoectomy, while successful in some cases if properly carried out, is disappointing in many others. Allow me to remind you here that apicoectomy is not often the simple operation some operators would have us believe, neither is it universally successful. The question of extraction, then, is one that must be considered from the standpoint of conditions. Given the case of a patient enjoying abounding health, showing no evidence of systemic infection, and where radiographs show no progressive destruction of periapical tissue, and where it is not desirable or possible to perform apicoectomy, palliative treatment may be resorted to, and even then the patient should be warned of the conditions and their possible sequelæ, and should be instructed to return at intervals to determine, by the means of radiographs, that necrosis of the bone and other tissue is not progressing.

In the cases of patients referred by physicians, demanding the immediate and complete eradication of possible areas of infection, which are evidently contributing to the general systemic conditions, as well as those cases coming under our own care, where the results of systemic infections in its many forms are evident, I believe that after a thoughtful consideration of all the foregoing statements you will agree with me that extraction and thorough curettment is the only alternative, and this too in the full realization of the impairment of mastication and consequent lack of nutrition that may ensue.

In conclusion, I want to say that I do not believe that any of us have ever cured many alveolar abscesses by medication, even where it was possible to irrigate through a fistula; especially is this so where there has been any appreciable amount of tissue destroyed or where cemental necrosis has taken place. By "cured" I mean radiographic proof of the complete reconstruction of bone and the reattachment of the peridental fibers in the affected area. The fistulous type takes on the form of a blind abscess, the micro-organisms simply become attenuated to a point of low virility, maintaining an inflammation so slight as to be unnoticed by the patient; nevertheless, the area remains one of lowered resistance, requiring constant supervision by the agents of repair, and a probable menace to the patient's future well-being.

The articles used for reference are:

"The Responsibilities of the Dentist in Systemic Diseases Arising from Dento-Alveolar Abscess, etc."
By C. J. Grieves, *Dental Cosmos*, May, 1914.

"The Relation of the Vitality of the Periapical Cementum and Adjacent Tissues to the Patient's Health and the Status of the Dental Profession, etc."
By C. J. Grieves, *Dental Cosmos*, Oct., 1915.

"Responsibility of the Dentist in the Event of Pulpless Teeth."
By E. S. Best, *Items of Interest*, July, 1915.

"The Interpretation of Dental Roentgenograms."
By E. H. Eisen, *Journal of the National Dental Association*, May, 1915.
"Indications of Dental Radiography."
By E. H. Eisen, *Dental Cosmos*, Aug. 1913.

"Uses and Advantages of the X-Rays as an Aid to Dental Diagnosis, etc."
By Raper, *Dental Cosmos*, May, 1915.

"Root-Canal Preparation." "Rosin Solution."
By Callahan, *Items of Interest*, Aug. 1915.

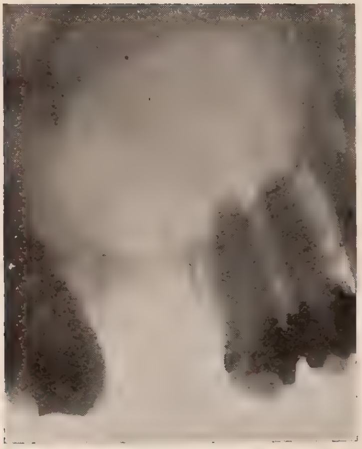
"Dentistry, a Blessing and a Curse."
By M. I. Schamberg, *Journal of the Allied Dental Society*, Dec. 1915.

and many other articles and discussions.

New First National Bank Building

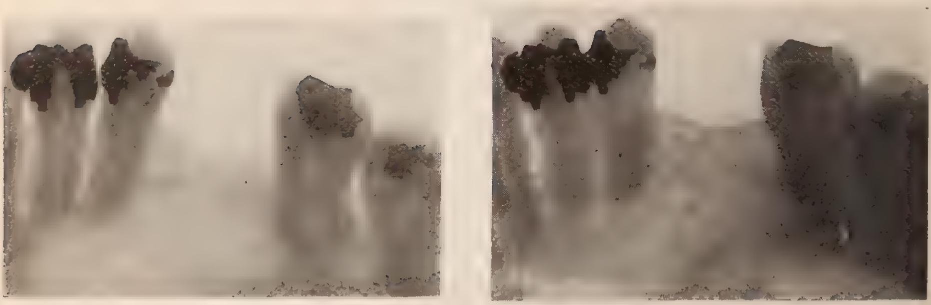
DISCUSSION

Dr. Sidney J. Rauh, Cincinnati: This paper has been an exhaustive resume of the work done concerning periapical infections; it would be out of place to go into much detail in the discussion. It is a subject of which we have all thought ever since the agitation has been re-started, and certain questions have suggested themselves to me which the dental profession must answer and soon. Dr. Richard Cabot, of Boston, who has done an immense amount of social work in medicine, has made the assertion that the only people who receive effective medical attention are the very rich and the very poor. The rich pay for it, and the poor are treated in our most excellent hospitals, clinics, etc. In dentistry the only people who receive effective treatment are the comparatively rich. The poor do not; and this in spite of the fact that many clinics are maintained. Why is this? It is due to the fact that in order to do effective root-canal work, probably the shortest time, leaving aside the simplest anterior teeth, is three hours for treatment, when you figure the strain upon both patient and operator, the operation is not a feasible one. I do not mean that it cannot be done. It can be and is done and we can show some cases. But it is not a feasible operation for the mass of people. If this is not a practical operation, what are we to do about it? Preventive dentistry is the thing we must develop, not specialized treatments. The dental profession should direct its thought to ways and means whereby we will effectively save the teeth and not cause disease, as we are doing to some extent.



Case 1, Slide 1

Case No. 1, Slide No. 1, May 1908, notice extent of tissue affected, taken after extraction.

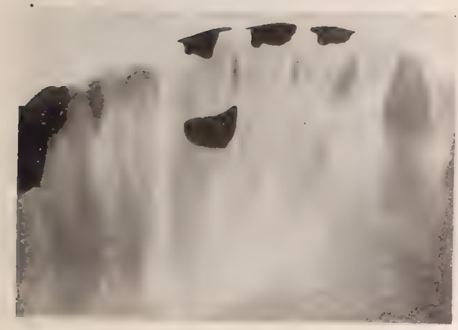


Case 1, Slide 2

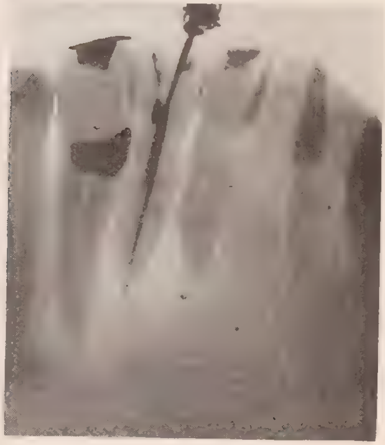
Case 1, Slide 3

Slide No. 2, September, 1908, tissue is almost reformed within a month.
Slide No. 3, June 1909, tissue is completely reformed and perfectly healthy, so that nature in one year filled that space perfectly, when cause was removed.

Case No. 2, showing various stages of healing:



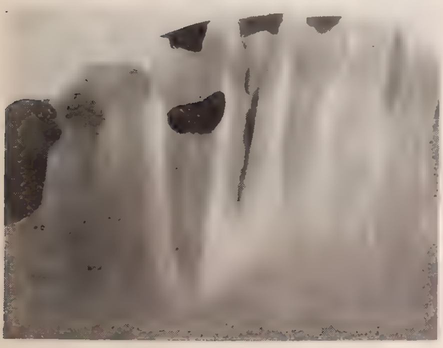
Case 2, Slide 1



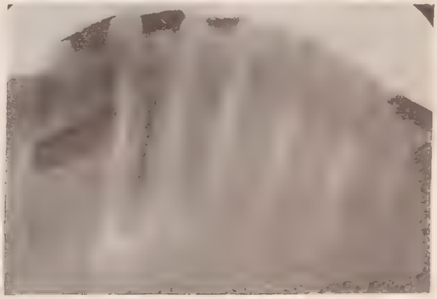
Case 2, Slide 2

Slide No. 1, June 21, 1913, an obscure case of abscess with a fistulous opening between the first bicuspid, cuspid, being mistaken at first for a case of pyorrhea. Pus was exuding along side of the distal surface of the cuspid and a probe could be passed; attempt to scale showed no deposit. Following evacuation of pus the case improved, but in a few days recurred. The X-ray shows the cause of the trouble, the lateral, not the cuspid, and pus area had extended under the root apex of the cuspid, and was exuding from there.

Slide No. 2, with the broach in position July 22, a little over a month later already tissue is reforming.



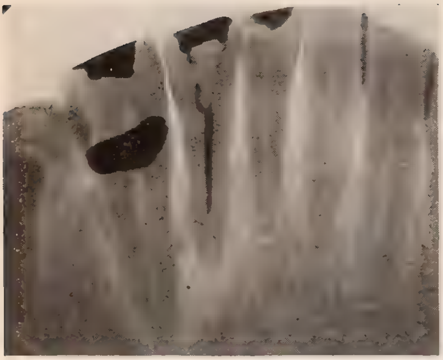
Case 2, Slide 3



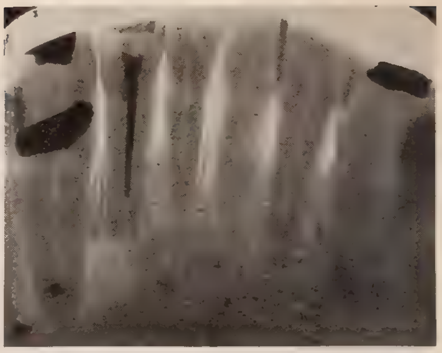
Case 2, Slide 4

Slide No. 3, October of same year, it is almost completely healed only original area of infection remaining.

Slide No. 4, December 17, almost complete healing.

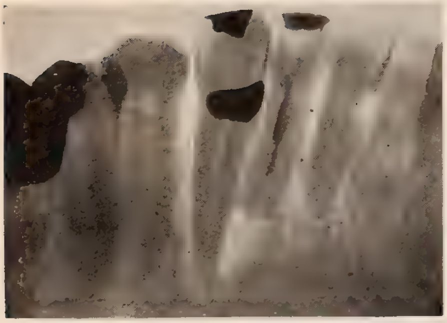


Case 2, Slide 5

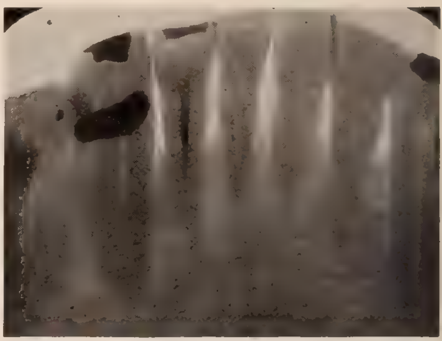


Case 2, Slide 6

Slide No. 5, May 28, 1914, about six months afterward.
Slide No. 6, February 11, 1915.



Case 2, Slide 7



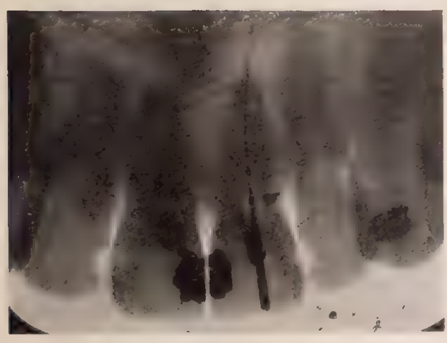
Case 2, Slide 8

Slide No. 7, September 29, 1915.
Slide No. 8, March 15, 1916.

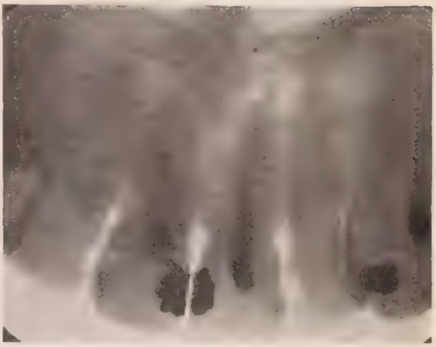
The root is not filled at present, has a cotton dressing. The next step will be to fill the root.

Dr. Temple: What was the method of treatment?

Dr. Rauh: Just the ordinary method, using mild medicaments all the time. The idea was to do as little treating as possible, and by trying to have an aseptic canal see if the tissue would reform. There was a decided necrosis of the end of the root when we started; this case has been a success.



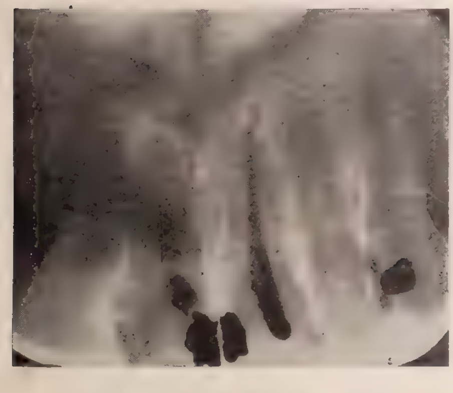
Case 3, Slide 1



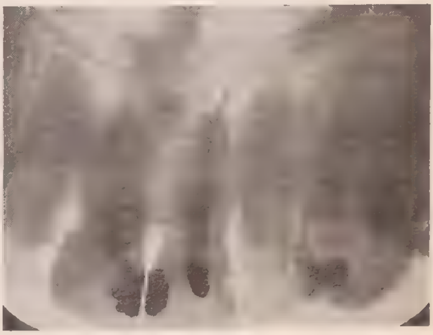
Case 3, Slide 2

Case No. 3, Slide No. 1, May 22, 1915. A case of an active abscess of a central incisor which had been treated for some time unsuccessfully when it presented.

Slide No. 2, July 8, 1915, after an ordinary treatment of opening up thoroughly, and curetting. I forced the gutta percha through the apex to see whether that treatment would be better than allowing it to go to the apex of the root.



Case 3, Slide 3



Case 3, Slide 4

Slide No. 3, September 1, 1915, there has been healing.

Slide No. 4, February 12, 1916, almost complete healing, the bone has formed. These are presented as a study, not to prove a point, but to see how far we can go with ordinary treatments to get a result.

Dr. L. L. Barber: Here two papers have been presented that to me are very important. This last paper deals not with filling, or, as we used to call it, "plugging" of the teeth, or half-filling or not-at-all-filling root canals; it deals with the conditions that are confronting us as a dental profession, conditions that we must rise to or get out of the game. It is going too fast and furious for any of us to go to a golf game and neglect the study of bacteriology, physiology, anatomy and so on. We must get down to business or get out.

One of the most noticeable features of the paper was the lack of dealing with the bacteriological side of this question. The essayist touched on it, but it is of much importance to a lot of us who have been going through this thing since last September, and any one who gets into the bacteriological side of it will soon learn that he must know at least the important bacteria that infest the mouth, their common avenues of entrance into the blood stream, the systemic troubles that they are likely to produce, and the kind of troubles that are most likely to result from foci of infection in the mouth.

With our facilities for and methods of examination of the teeth and vicinity, around crowns and fillings, and teeth that are being regulated, we should do better than is being done, and I am afraid *some* of the orthodontists have much to answer for, with all due regard for them. Their main idea seems to be to get the teeth in line, and they seem to have forgotten the conditions we have to contend with afterwards. With the means we have at hand for making a physical examination of the teeth, we must so inform ourselves that we will be able, without a skiagraph, to recognize many of the systemic conditions that arise through foci of infection in the mouth. After we have done that, it is important to have your X-ray picture to verify or contradict our examination.

Dr. Temple has been making a great many pictures of the teeth and adjacent tissues, and he said we don't know whether the roots are filled or not until we take our picture. An X-ray picture does not always tell whether a root is or is not filled. It is a common thing not to show all three of the roots of an upper molar or all three of the canals of a lower molar, and, so far as I know, a canal may be so small and yet filled with ordinary gutta percha that it will not show at all well up to the apex; so that, until we get a gutta-percha root filling that has something else incorporated with it that will make it take a better shadow, we will not be able to tell absolutely whether or not roots are filled. However, if the picture does show that the root is filled, then in all probability it is filled; but, gentlemen, you cannot depend too much upon your X-ray pictures as we are now able to read them. I believe no one should read and give a diagnosis on an X-ray picture of the teeth unless he sees the case himself. He may give an opinion upon what he sees in the picture, but not as to what the case is.

We make a good many pictures every day and develop them in the office. I believe that is something we should do. Taking your pictures out to an ordinary photographer, they lose sight of what we want to see. They do not seem to be able to look at the grain of the bone and tell whether it is right or wrong.

The X-ray does not always tell us whether or not there is an abscess at the apex of the root. It does not always tell us whether or not the root is in the antrum. Another thing that I have been very much surprised at since using the X-ray is the number of roots that enter the antrum, and if you in your ordinary extractions make a curettment of a pocket where an abscessed tooth has been extracted, that is, a second bicuspid or a first or second molar, the latter perhaps as frequently as any other tooth, you will be surprised at the number of times you will enter the antrum.

About the operation of apicoectomy: Dr. Temple did not talk about that lightly, but he put the right construction upon it; but it is some times talked of very lightly. They say "just go up and cut off the end of the root, and your abscess will heal, and your tooth will be all right." That is not true. Not that it is not done successfully many times; but, gentlemen, confine yourself to one-rooted teeth, and to be still safer, to the upper jaw. I do not say you won't have success in the lower, but you know some times they get well of themselves, and just exactly how far we assist them I do not know.

It is a surprising fact to me in looking at any number of X-ray pictures to see the number of roots where the condition at the apex is absolutely normal so far as you can tell from your picture, and the root is not half filled; and to offset that, the great number of roots that apparently are filled perfectly, where you have great rarefied areas and active abscesses. I can understand very well that you might go in and extirpate a pulp that is perfectly alive; you may bring about an infection there; you may introduce medicaments that would produce a condition in the apical region that in after years might break down and produce an infection; but to understand why, when the rubber dam was not placed and nothing was done to prevent infection, and that didn't abscess at all, and the other one, where you apparently take the greatest of care, you have the abscess, I don't understand. Every dentist should make it his business to thoroughly understand what sterilization means, when sterilization has taken place, and prepare himself to do it, *and then do it*, because he has got to do it sooner or later. With the utmost care in sterilization of instruments, rubber dam, area, tooth substance, your hands, and everything about you, with the best you can do under the circumstances, you will frequently get a growth. Treating a tooth is like a watchmaker fixing your watch, and you carrying it all the time. A surgeon puts you in bed and bandages you up, and there you must stay. But with a tooth,—they are carrying that around with them all the while; and patients can't keep their teeth sterile.

How far shall we put our root filling? How well shall we cleanse that root canal? We must take out every particle of pulp fiber, and yet we must know that the only canal out of which we get the pulp fiber is the canal through which the instruments will go. If you get a canal at right angles to the main canal in the root,—how will you get your nerve fiber out of there? You cannot do it. A friend of mine says you must put a certain-size ball of gutta percha upon the end of the root and seal it there. How will he get it there? If you have an abscess or opening there at all, I do not believe your gutta percha does any harm, but I don't think it does any good. All of this fineness of technic is important, but to me it is more important that we have things absolutely clean, and as near sterile as it is possible to get them, and then our trouble will be minimized.

Dr. Rauh spoke of this, that when we accomplish all of this with the technic and the care and the expense and the trouble that we must go to now to half-do it, are we doing very much for humanity, because it simply rules out the great majority of pulpless teeth, and they must simply be extracted.

Dr. Temple: (Closing.) Dr. Rauh spoke about root-canal work not being a feasible operation. I scarcely know what he means by that, except that the cost in a large majority of cases is prohibitive. It is feasible where we can succeed, and even though we fail in a large number of cases, that should not deter us from trying to do our best in those cases where it is possible to succeed. The solution of this will come through preventive dentistry. I do not expect to live to see the day when that will reduce the number of pulp operations very much.

It is true that radiographs will some times show much reconstruction of bone in areas where it formerly has been destroyed. That is due to the fact that the medicaments used, or the efforts of Nature bring about at least an attenuation of the action of the bacteria concerned, and while we get a reproduction of bone that apparently fills the area entirely, still, considering the physiological conditions concerned in the tissues there, it is impossible to get a re-attachment of the tissues; and having a necrotic cemental area there, no matter if it has been sterilized by ionization or not, you still have dead tissue, and it is subject to tissue infiltration which in time is bound to decompose or would have a tendency to, and it calls for constant reparative efforts, which tend to lower the resistance there. While we have apparently a restored condition, I doubt whether that is so. Dr. Eisen has had much experience in radiographic work, and has handled many cases suffering from systemic infection, and he demonstrates that many cases where systemic infection has been traced to some tooth, there was no appreciable tissue destruction around that tooth at all, and yet the cases were some of the most virulent they had to deal with.

Dr. Thoma has an article in one of the last journals of the Allied Dental Societies covering cases where ionic medication was used, and in those cases in particular, explorations afterward show that cultures could be made from every one of them. Dr. Grieves carried on a series of experiments with ionic medication, and in some cases, after two years could get cultures, and in some cases where bone seemed reconstructed, he found the area reconstructed very much smaller than shown in the radiograph, and that infection was present in most of them.

Dr. Barber: How many cases of teeth where the pulps are not dead at all can you make a culture from the apex of the root?

Dr. Temple: I could not say from my own experience.

Dr. Barber: We have tried it, and apparently without pockets around the sides, and yet with a live pulp in where we would have one tooth or more to take out, doing it under asceptic conditions as far as possible, and you can make a culture from it.

Dr. Temple: There is the question, "as far as possible."

Dr. Barber: But how do they know they can go into these teeth after two years' time and make a culture?

Dr. Temple: Because pure cultures of bacteria were obtained.

Another thought came to me in connection with Dr. Rauh's discussion and that is that perfect root-canal filling was apparent, and still conditions were not perfect there. Perfect root-canal filling is not the only thing to be considered, especially in cases where the pulp has been devitalized by the dentist and root-canal fillings placed. It might have been a perfect root-canal filling, but if he has carried infection in there, the root-canal filling does not stop the action of the bacteria.

I believe Dr. Barber is right, that we must get in line as to physiology, histology, and bacteriology, etc., or get out. The time is coming when knowledge of these conditions will be absolutely demanded. Dr. Rauh spoke as to whether the X-ray confirmed whether or not we had a complete root-canal filling. There are cases where the angle at which you take the picture would show it was short, and from another angle it might show it was filled. Then, as was said, some canals are so fine that even though gutta percha goes clear to the end, it doesn't show in the canal. I have seen it demonstrated where apparently the filling did not seem to go to the end, there would be a nodule of the gutta percha at the end of the root.

I think Dr. Rauh's studies in experimenting and following the experiments up with radiograph are very interesting.

Forsyth Library

At the last meeting of the Board of Trustees of the Forsyth Dental Infirmary, it was voted that the Library and Museum be established as a definite department of the Infirmary, and the same placed under the immediate supervision of a Librarian and Curator, and Dr. Frederick Keyes, of Boston was appointed to the new position. It is expected that this department will be developed to a high degree and that it will take second place to none.

ARE CROWNS AND BRIDGES A MENACE TO HEALTH?*

BY W. O. HULICK, D.D.S., CINCINNATI, OHIO

I AM quite sure the medical and dental professions are agreed that the most important problem to be considered at this time in the treatment of the oral cavity and repair of the teeth, is, "Are crowns and bridges a menace to health?" Now, while I know they are such to an alarming degree, and in many hundreds of cases in which infectious diseases are not responsive to the usual treatments and in which the diagnoses from scientific investigations have proven that the foci of infection was within the oral cavity, it is my opinion that the pendulum of professional and public prejudice has swung a little too far in their condemnation. So effectually has this been driven home, and so positive are the medical men, and unreasonable, too, at times, in their demands for their removal and non-adoption, that we will discuss the question briefly today, more from a practical, than a scientific, standpoint.

Many times medical men base their theories from observations of cases thought to be traceable to the crown and bridge, but which were not, or probably were not primarily, while later on they might have had something to do with systemic manifestations. The physician thinks, as a matter of fact, all crowns and bridges are a source of infection, and while it is true to a greater or lesser degree, scientifically speaking, because they are foreign and unnatural to the body, it must be understood all crowns and bridges are not a source of infection, neither are they a detriment to the body, but the physician, who is a busy man, and scientific too, makes statements without a thorough knowledge of the fundamental principles or the mechanical application, consequently he does not know whether they are good or bad. It is in all fairness that I make these remarks, and with the definite purpose to enlighten, educate and assist so as to prevent statements which are misleading to the patient.

I shall therefore try to point out when crowns and bridges are a menace to health and when they are not; why they are a menace to health, and why they are not; how to differentiate in systemic manifestations as regards the crown and bridge, treatments, repair of the teeth, salivary calculi and unclean mouths.

It is definitely proven that the teeth in their natural environments, do not become pathologically unclean or decay. It is likewise definitely proven that unclean mouths cause decay, and also promote tartar deposits, first in the protected places, and later around the necks of teeth even to the apical ends. Primarily this is the start of all the trouble, and it is at this time the "fight is on," which means it is up to our profession to demonstrate to the medical profession that repair of the mouth is as essential to the health of the body as systemic treatment, and also that the crown and bridge does not, generally speaking, cause oral sepsis, any more alarming than does treatment of devital teeth, or pockets around the necks of teeth from tartar deposits, and unkept mouths.

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*Read before the Ohio State Dental Society.

It is definitely proven that more teeth are lost from tartar deposits, than from the crown and bridge, and it may be said in justice to all, that if crowns and bridges are placed on teeth in this condition, whether mechanical application be good or bad, the ultimate result will be the same, although the crown and bridge will get all the blame.

I do not deny that crowns and bridges are in the main faulty, and that they have caused in the past and still do cause untold sickness and suffering. However, I shall try to prove that they can and are made sufficiently sanitary, so as not to be a menace to the health of the body, but a benefit.

It is not essentially my purpose to make an appeal to you, but suffice it to say "the handwriting on the wall" points to the extreme gravity of the situation, which calls for co-operation of both professions, assisted by those we serve, for dental righteousness; in fact, gentlemen, this is the psychological moment in mouth repair.

We must acknowledge that to repair the mouth near perfect is not an easy operation; in fact it is extremely difficult, almost impossible at times, owing to conditions beyond our control; consequently we will concede this fact—once repaired the mouth is never again in a perfect or normal condition pathologically, and is constantly more susceptible to infection from micro-organisms, and to a greater or lesser degree, according to character and kind of repair, also habits of individual.

I refer especially to the crown and bridge, fixed or removable, partial dentures with or without clasps, or other forms of restorations. Next in importance is the treatment of root canals, which is generally referred to as causing infection from within, while all mechanical repairs, which includes fillings, are considered as a means of infection from without, i. e., around roots of teeth at gum margin and contiguous parts. These are the points we are to discuss.

While it is the negation of all the physiological and pathological truths to dam or cover up infection with gold cap crowns, or place around roots of teeth ill-fitting bands, or place crowns on root ends of teeth which do not fit, or supplies that impinge on the underlying tissues even to the alveolar process, it is likewise true that it is the negation of the physiological and pathological truths for patients to so neglect their mouths and teeth that systemic disorders are manifest from oral sepsis even where there is no repair. I mention this to bring out the point that whether a repair be good or bad, subsequent conditions are absolutely beyond our control, which means, as I take it, that we should be more careful in the selection of cases, conditions and methods of repair, lest we make conditions worse rather than better. I will illustrate this to you by taking the clean mouth as an example, although many teeth, especially grinders, were lost. This condition impairs mastication, also makes repairs extremely difficult, and with ill-fitting crowns and supplies poorly adapted the result is apparent. I take it that this mouth will very soon show signs of uncleanliness, with inflammation around necks of teeth so crowned, and under the supplies, even though the patient exerts extreme care with brush, floss and antiseptics; nor can the dentist by instrumentation and brush wheel on the dental engine remove the debris.

Under these unnatural conditions, decomposition of this debris is sure to dam up the blood supply, which will cause an absorption of septic matter and micro-organisms even to the root ends, which will later get into the blood stream and cause systemic complications, especially alarming and dangerous, and, at times, a menace to health.

Gentlemen, I do not think the picture as painted unreasonable, and you will agree with me, a menace to the health, and you will also agree, a condition over which the patient has no control, and for which he is not responsible.

On the other hand, we will reverse the scene and paint another picture where the crowns and bridges are mechanically as perfect as a mechanic and artist can make them, the adaptations, bands to the roots, or crown ends to root ends, and supplies which do not impinge on the underlying tissues: I take it that with the occlusion worked out on natural lines, interdental spaces left open to protect the gum margins around the necks of teeth and with all contact points closed, crowns and bridges are not a menace, but a very great benefit to the health of the body.

We are agreed that any mechanical repair is foreign to the delicate tissues surrounding the necks of teeth and contiguous parts, and Nature tries to eliminate them, or get away from them, so to speak; consequently modern methods of procedure will soon eliminate bands from around necks of teeth, bridges will be made in most instances removable, engaging strong healthy teeth as supports, with the inlay. Where gold crowns are employed, they will be made mostly flush to the gum, without bands. Porcelain or combination crowns will be made to fit the root ends, also with inlay or invisible bands, so perfect that no more inflammation will be manifest than is found around the necks of teeth in a normal condition.

We have considered a few points where the crown and bridge is, and is not, a menace to health. We will now point out a condition why the crown is blamed for infection when it should not be. We will take the treated tooth as an example, where the root-canal treatment may not be perfect, a treatment that is most difficult and in the most part unsatisfactory, owing to crooked roots and other unfavorable conditions, which comes in for some comment by the physician at this time. We will place a perfect crown, if you please, on this root, which bottles up this infection so effectually that there is only one outlet, the apical end. This infection, in the form of gases, can only be absorbed through the cellular tissues in the alveolus, and into the blood stream. The crown in this instance is unjustly blamed for a condition that has caused endless suffering, partial paralysis and even death. In order to avoid these conditions, we must feel reasonably sure of the root-canal treatment before placing any crown or filling in position, and it is reasonable to expect such operations in the near future will be carried on in connection with the radiograph, to determine whether root canals are properly filled. When in doubt, radiography will be used to assist us in root preparation for gold cap crown or dowel crown. We will also use the radiograph after crowns are made and in position, before cementing, to find defects and correct them.

I am quite sure the time has come when these defects must be overcome, and while I have been one of the many to call attention to the necessity for improvement in the mechanical application, I am likewise quite sure that crowns and bridges are blamed for many more ills of the body than they really cause, which means, as I take it, that it is the operator and not the operation that is to be criticised.

Sanitary mouths and sanitary dentistry, is now and must be the slogan, from this time on, and while we cannot compel patients to keep their mouths clean, we can at least do our part by overcoming the defects that make it utterly impossible to keep the mouth clean, even though they be so inclined.

We owe this to humanity; let us do our duty.

MUCH ADO ABOUT ADVERTISING

BY DR. HOWARD R. RAPER, INDIANAPOLIS

(*Written upon request.*)

ONE THING leads to another, and so here I am, devoting time to something which I had intended to dispose of in one evening.

At the time the Modern Ethical Dental Association—an association composed of advertising dentists—was being organized in Indiana, I observed that they, the advertising dentists, were receiving the unstinted support of advertising experts. (By advertising experts I mean the men who make their living by soliciting advertisements, writing advertisements, conducting advertising campaigns, etc.) To me, this seemed wrong, for most advertising experts you know, are members of the Associated Advertiser's Clubs of the World, which organization has for its motto, slogan, middle name and object in life "truth in advertising."

I asked myself, "Why do these advertising experts, who believe in truthful, constructive advertising, encourage and support, or even tolerate the sort of advertising indulged in by dentists?" I also asked my dentist friends the question, and some of them said "money," and others said "bread and butter," and others jingled the silver in their pockets and winked, or smiled. But I could not accept these answers for I know that advertising experts are like other men in other walks of life; taken as a whole, they are honest; we dentists call it "ethical." The only satisfactory answer I could find to the question was that the advertising experts could not *see* fraud, dishonesty and destruction in the advertisements printed by dentists.

Accordingly one of my dentist friends arranged a dinner to which the advertising experts were invited. After the dinner I did my best to show the advertising experts wherein advertising, as now indulged in by dentists, is not constructive but destructive, not honest but dishonest, not inoffensive but vicious. I used models and lantern slides to illustrate my talk and I tried to attack dental advertising rather than the advertising dentist, and when I was through I had accomplished my purpose. The men I had addressed had thought that the non-advertising dentist condemns the advertising dentist for the sole and simple reason that the latter advertises; that the nature of the advertisement itself might be worthy of condemnation never occurred to them.

"But *all* advertisements by dentists are not bad," they said. And I asked them to name some dentists whose advertisements were not made up principally of "objectionable features." (By this time we had all agreed that there were "objectionable features" in advertisements by dentists.) And they did what I asked them to do, they named a dentist who had advertised in the daily papers and whose advertisements, so far as I know, had been clean, constructive and honest. This man's advertising activities extended only over a few months.

I asked them to name another dental advertiser who indulged in similar unobjectionable dental advertising, and, though Indianapolis has many dental advertisers, they could not think of any other man or firm which did not indulge in the sort of advertising we had decided to be objectionable. "Why haven't you told us of this before?" the advertising experts asked me. "Why don't you tell this to the public?" "Why haven't you done thus-and-so-before" is always a hard question to answer, so I ignored it and replied to the second question by saying I was perfectly willing to tell any one who was interested enough to listen to what I had told them, that I would tell the advertising dentists themselves the same thing if they (the advertising dentists) could be induced to listen.

The latter part of the foregoing was uttered, I must admit, somewhat in bravado, when rather feverish from argument, and yet I am not sorry; I meant what I said and I wanted my audience to believe I was not afraid to meet, in open controversy, the men who would be most likely to take exception to what I said.

One of the advertising experts in my audience holds the position of secretary of the Better Business Bureau of Indianapolis. The function of the Bureau is to clean up dirty advertising, or, as its secretary might word it, "eliminate objectionable advertising and promote truthful, constructive advertising."

Mr. Secretary nailed me, called my bluff, thus: He could see from the evidence submitted that some day he might be called upon to clean up dental advertising. To him the advertising dentist has become a problem, a menace to advertising in its biggest, most ethical sense. And so, in order that I might help him in his work of promoting honest advertising and eliminating objectionable advertising, he procured for me, and handed to me, an invitation to address the Modern Ethical Dental Association.

I accepted the invitation and addressed the Modern Ethical Dental Association, lecturing on the subject "The Difference between Good and Bad Dentistry and its Relation to Advertising."

At the close of my lecture did the members of the Modern Ethical Dental Association attack my lecture, tear it to pieces and make me eat the pieces? They did not; they did not discuss it at all—at the meeting. In the published report of the proceedings of the meeting, however, I find quite a wordy discussion of my lecture, but the lecture itself is left out.

This discussion appears on the last four pages under the title "The Human Side of Dentistry vs. the So-Called Ethical Side." It is signed "The Convention Committee, Dr. C. W. Owens, Chairman."

It is my opinion that the chairman did not write it, that it was written by either Mr. Snider or Mr. Jennie, advertising experts of the Bookwalter-Ball Publishing Co. of Indianapolis, the men who were employed by the advertising dentists to organize their society and the men who wrote that splendid advertising stuff which was sent out broadcast at the time of the organization of the Modern Ethical Dental Association.

I consider the matter of authorship so that if possible blame may be placed where blame belongs.

Whoever committed that atrocity under the title "The Human Side of Dentistry vs. the So-Called Ethical Side," whoever he may be, I say, he is intelligent; that is the only nice thing I can say about him.

If what Darwin says is true that "no one who loves victory more than truth should argue," then this author should never argue, for he has no regard for the truth at all, and he seems willing to do anything to score a point.

There is no end to what I *might* write in answer to the criticism of my lecture, but there is an end, which is not *very* far away, to what I *will* write. I shall touch only on a few of the grossest misrepresentations and say: If any defender of the present advertising indulged in by dentists wishes to debate the matter with me before an audience of say not less than fifty advertising experts and laymen of recognized prominence and intelligence, I will agree to prove to the audience that any defense he may offer is inadequate.

I am accused of saying, "That advertising *per se* leads to defective work." I never made such a statement. That dental advertising, as now indulged in by most advertising dentists, where low price is featured, leads to defective dental work, is, I believe, a demonstrable fact.

I am quoted as saying, "That guarantees in dental advertising are uniformly vicious." The word "uniformly" is inserted; it is not my word. Cut out the word "uniformly" and I will accept the foregoing as my statement and defend it.

I quote: "It was charged by the speaker in question, who upheld the contentions of the 'old school' group, and attacked advertising dentists, in their entirety, that the prices of advertising dentists are only a catch, a bait, and a lure, and that wherever he can, he imposes additional costs under misrepresentations as to the quality of the materials and the character of the work for which he sets a higher price."

Guilty! I did say it. I can prove the truth of my statement. To prove it fully takes more space than I have at my disposal here. I must satisfy myself with a quotation or two from dental advertising: "Machine made Teeth $3.00. Hand made Teeth $5.00." "14K Gold Crowns $3.00. 18K Gold Crowns $4.00. 22K Gold Crowns $5.00." These advertisements feature the price-boosting idea. This is not the usual method, however. As a rule it is not until the patient has answered the advertisement for $3.00 crowns that he learns that "these crowns are only 14K crowns, and that 22K crowns cost $5.00."

I am quoted as saying: "That substitutions and the use of inferior materials are habitual with advertising dentists."

I said nothing about "substitutions" unless the insertion of an amalgam filling and naming it a platinum filling may be called a substitution, but I did say that advertising dentists, as a body, use cheaper materials than the non-advertising dentists as a body, and it is true.

I am given credit for saying this: "That some 'experts' in plate making say that it sometimes takes a week to make a proper plate, and that therefore it is impossible to make a satisfactory plate for the prices quoted by the advertising dentists."

Instead of "a week" I said "eight hours." I was quoting from Clapp's book "Profitable Practice."

My critic pretends that he thinks I said this: "That all evil and unprofessional practices in dentistry are confined to the advertiser, and that unprofessional and incompetent work is somehow inseparable from advertising."

I said nothing of the sort. The advertising of cheap prices does produce bad work. Nor is it only the advertising dentist who does the bad work which is the product of advertising impossible prices. I am told on page nineteen of the published proceedings that "others besides the dental advertiser have done poor dental work." How perfectly well I know this, and I mentioned it in my lecture, though my reviewer elects to assume I did not. If the advertising dentist affected only his own work by the prices he advertises, his influence would not be so damaging to the quality of dental operations. But practically all dentists, and particularly the young men, are *hindered* in their efforts to work to high ideals, by the price-lists published by advertising dentists.

I said this: "That the advertising dentist contributes nothing to the knowledge of the so-called 'ethical' group."

I did say it; it's true.

And here is the way my reviewer closes. He quotes me as saying: "That it is better for the patient of meager means not to have work done than to go to the advertising dentist, and that such a patient must abandon the hope of having any adequate dental work done, unless he can provide the prices exacted by the so-called ethical group. In a word, that the meager earners are beneath dentistry because they cannot pay the price."

The last sentence of the above is not mine. The next two paragraphs are too good to miss so I print them for you.

"This, indeed, is an amazing statement of ethical obligation. This is the principle of the so-called ethical school, so stated by one of its authorized representatives. Comment is superfluous. It is necessary to ask only how such a conception of the ideals of a dignified profession squares with the principles of morally right conduct. And this from a man pretending to uphold the ethical standards of his profession!

"If the young woman earning $10 a week—and this was the lecturer's own illustration—is not to receive the benefits of dentistry because she does not earn enough to enable her to pay what the ethical man charges, where really is the boasted professional standard of the ethical group? What becomes of the duty of the profession to humanity? What becomes of the obligation to impart its knowledge and practice, its healing and curative art, if such a conception is to prevail?"

The foregoing is very good oratory, but no man who has the interests of humanity at heart, as the writer of the foregoing pretends to have, would distort the point I made in this connection, to score a point in his own silly argument. It is too serious a matter.

Let me place before you this problem of the $10.00-a-week girl as I see it, and as I placed it before the Modern Ethical Dental Association:

It is the practice of many advertising dentists to say in substance in their advertisements "No matter how poor you may be, or what the condition of your teeth, we can give you the dental work you need at prices you can afford to pay." This is vicious. It encourages neglect of the teeth with a promise that they cannot be so far neglected that they cannot be repaired at a very meager cost.

The truth of the matter is that if we treat teeth and fill canals as we now believe it should be done, even people in moderate circumstances cannot afford to have a great number of teeth treated. Almost anybody can afford to have their teeth filled and refilled as small cavities occur, and so avoid the necessity of pulp-canal work, but it is a *fact*, "the $10.00-a-week girl" cannot afford much canal work, if the canal work is of the right kind. And if it is not of the right sort, it may ruin her health or destroy her life. Her only hope lies in precaution, the only thing she can afford. To encourage her to neglect her teeth by a promise that she can afford to do it, then when she has neglected her mouth until it is a hopeless, septic mess, to sell her gold crowns and bridges which make her mouth still more septic, is a crime.

It was my contention, and still is my contention, that if a dentist practices dentistry as he should today, he will *not* also encourage people to neglect their teeth, giving them assurance that their income cannot be too small for them to meet the dental bill resulting from such neglect. He will instead warn them of the dangers of neglecting their teeth, tell them frankly that unless they have considerable money they cannot afford to have many teeth treated, and explain to them how they may avoid toothache and by so doing, evade treatment which incurs an expense they cannot meet.

Nobody can afford to do what the people as a whole still do, namely, make it their practice to deliberately neglect their teeth until they ache before going to a dentist. (A tooth which has ached, spells pulp-canal work.) Rich people cannot afford to indulge in this practice from the standpoint of health. Poor people cannot afford it because they haven't the money to pay for it, and also from the standpoint of health.

The attitude of all dentists in the past has been "You say your tooth has ached—well, that makes no difference." This is no longer the attitude of the progressive, conscientious dentist today.

Until the dental profession teaches the people the *truth* about the difficulty, the limitations *and the great expense* of the only sort of pulp-canal work which should be practiced (i. e., aseptic, *actual* canal work), we will remain as we are now, unable, tragically, pitifully unable, to treat people's teeth properly. The amount of pulp-canal work there is to be done, with practically nothing being done to check the source of supply, is appalling when viewed in the light of our present knowledge regarding metastatic infections and modern canal work.

All of the dentists in the world, doing nothing but pulp-canal work, and doing aseptic, radiographic pulp-canal work, could not take care of the people in New York. It is silly for dentists to think they can solve the problem of pulp-canal work for the poor by doing charity work, *because there is too much of it to be done.* Even if everybody could afford to pay for it, still the dental profession could not supply the right kind of canal work—there is *too much of it.*

And so when I tell the Modern Ethical Dental Association that people should be warned "not to let their teeth ache" because it will place them in need of a dental service which they cannot afford, and a word-juggler chooses to construe this to mean that I have said "poor people are not entitled to dental service," it makes me want to take the word-juggler's typewriter away from him, and keep it until he promises to be good. And when an organization of thirty-odd dentists permits such clap-trap to interfere with an honest consideration of a great social problem, I think they are either stupid or unethical and, which is worse, unkind.

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SPEAKING OF THREE-DOLLAR CROWNS:

For a patient to pay a dentist for placing a crown on a tooth with a septic pulp canal, is a good deal like paying a prostitute for—gonorrhea.

PRESIDENT'S ADDRESS*

BY R. R. GILLIS, D.D.S., HAMMOND, IND.

ONE OF the most important duties, perhaps, of the president is that he should formulate some outline of the present status of the profession in his state. It was my purpose, in addition to this, to have given you something along one line, and I began preparations. But after a bit, when the chairman of the Executive Committee announced his tentative program, I found another gentleman was covering the subject. I then switched to another subject, and when the program finally came out, I found that was covered also; so of necessity my address is devoid of those two subjects.

REPUTATION OF OUR PROFESSION DETERMINED BY OURSELVES

I have not prepared a written manuscript, but will talk in rather an impromptu manner, and will call attention to only two or three essential points. The text of my talk is summed up very much in the article which appeared in the last issue of our *Bulletin*, and which I desire to read to you believing that the effectiveness of any organization depends upon its individuals. I endeavored to appeal to you personally in that article under the title of "How Measures our Profession in Your Town?" feeling that it was up to each of you individually to make an answer. A little retrospection would show you, if you could do it in an unbaised way, what the people of your town think of you. They will judge our entire profession by such members as they come in personal contact with most, and I wonder how they judge our profession when they look at you in your several locations.

CONSTANT ADVANCEMENT OF PROFESSION

(Reads article on page 4 of *Bulletin* of May, 1916.)

Dentistry in the last ten years has made such improvements that it is trite for me to call your attention to them. Every time you pick up a magazine your attention is called to the fact that our profession is evolving into one that stands on a par with every other and is a peer to many. In Indiana there seems to be a tendency among a few, and not a negligible few either, to rest somewhat upon the laurels that have been won during our past years. You all know that there is no such thing as standing still. You all know that unless constant effort is being exerted, no advancement is made.

A HOOSIER PROGRAM

Last year's program by Indiana dentists brought out latent talent of which few had any cognizance previous to that time. The scheme was so successful that we concluded to repeat it this year, putting on the entire program by Indiana dentists. Indiana has the same material, just as good material within its borders, as any other state in the Union, but if we depend entirely upon outsiders to come and tell us the things we should be able to teach to ourselves, very little progress is made thereby. We are simply in the position of a sponge, absorbing everything that comes our way; some time, when we are put to the crucial test, I am afraid we will have used up all the good we have absorbed in the past and will be able to give nothing back of any value. The fact that we are teaching ourselves, educating ourselves and evolving new strength constantly, is for the great betterment of the profession in our state.

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*Address before the Indiana State Dental Society, 1916.

COMPONENT ORGANIZATION

One of the main factors in such development is the organization of our state into component societies. The other states about us and all over the Union for that matter, are falling in line with this idea, recognizing its worth; and, while Indiana has made some progress along this line, we haven't developed as far as we would have liked. At the present time, most all of the north end of the state is organized into component societies, or at least into local societies, which are the nuclei of component organizations, and probably before this meeting is over we will be able to announce that the greater part of our state is organized into component societies. Through the southern part of the state, with one or two exceptions, little has been done, and we hope that the example set by the brethren in the northern part will be an incentive to the southern brothers to come up and do their full duty.

THE RESEARCH INSTITUTE

One of the greatest movements now before the National Dental Association, and the one from which our profession is to receive the greatest benefit, is the Research Institute, which was organized a few years ago, and was more recently made an active part of the national organization. This probably will be discussed more fully later, and I wish briefly to mention only two or three points in connection with it. Many of you know that individual Indiana dentists, in 1913 and 1914, made pledges for this work. I regret to say that many evidently forgot that they had made such a pledge. In a letter from Dr. Price the other day, he called my attention to the fact that Indiana had not been doing very well on those pledges. While we pledged a total from 190 subscribers of $3,634, there was still due at that date, May 9, $2,383.50, and out of that $2,383.50 which was due at that date, only $763 has been paid. Twenty per cent. of our pledgers have not even made their first payment, ninety-two per cent. have this year's payment to make, and approximately seventy per cent. owe more than this year's payment.

You probably know that, up to the present time, the individual pledge has been the only source of income of this Commission or Institute. This is a most worthy cause. Unless our profession can support it as it should be supported, the desired results cannot be obtained. You have had your reports through the *National Bulletin*, have had your attention called to the work through other sources, and you probably are aware of the fact that the Research Institute is now fully established, incorporated, and that they have done everything that can be done to place it on a firm basis. It is most deserving of our hearty support. Many states have contributed from their state treasury to this work. Several states have added to their annual dues in order that it might be supported more loyally. In Indiana, I do not know that we are quite in position to take that step, but if the men who have made their individual pledges will keep them, and if others who appreciate this work will make pledges, I believe that more ready money will be forthcoming from our state than if we add to our annual dues, for the increased dues would be an excuse for others to fail to come into the fold, who would not appreciate fully the great value of this movement.

NATIONAL MEETING

I would call your attention to the meeting of the National Association, which this year is to be held at Louisville. Probably it will be a long time before it again comes so close to our doors. Many of us never have attended a session of the National Association. For that reason, few of us probably realize the great value of such a meeting. We know that we derive benefit from our local organizations, and that we derive benefit from our State Association meetings; otherwise, we would not be here today. Just in proportion as the State Association is larger than the local association, you derive more benefit from this association than from your local association; and, as the National Association is larger than the State Association, so you will derive greater benefit from attendance at the National. It is so close that I would urge you all to make plans to be there.

THE PREPAREDNESS LEAGUE

A couple or three weeks ago you received a circular letter from a newly-born organization, the Preparedness League of American Dentists. The resolution which passed our body last May, directed to the President of the United States, was exactly along the same line, but went a little bit farther. While that may have meant little or nothing to some of us, it really meant a great deal if you take it seriously. The National Preparedness League of American Dentists tends to crystallize the sentiment expressed in our resolution into something that will be worth while, a concrete thing, and if you have that circular yet and the application accompanying it, I would urge you to pay attention to it. The purport is simply to obtain the name of dentists, and we hope to have 20,000, who are willing to offer their services gratis for the betterment of men who are willing to volunteer for military service for Uncle Sam.

ARMY DENTAL LEGISLATION

As you all know, we have a contract army dental corps. You are probably aware of the movement that is being put through Congress now, and for the past number of months the National Legislative Committee has been working hard that they might attain their desires in that connection. They have succeeded to the point where the provisions of the Army Bill embody all that they have asked for. The contract army dental surgeon is a nonentity from the army officer's standpoint. He is simply a servant and nothing more. Under the new bill, the members of the army dental corps will be on a par with the army medical corps; the rank accorded them will place them on a par with the equivalent rank in any other department of the army. It is a very good thing. But in order that we may be ready, preparedness being the thing uppermost in most minds at the present time—the Preparedness League is making this move and hopes to enlist the services of many of our dentists over the country. You can simply subscribe to that without a remittance if you wish. Better still, send in your one dollar and become an active member.

PREPAREDNESS

While some of us may have the pacifist's idea that preparedness leads to war, I do not believe many of us at this date still retain that idea. It appears actually foolish to my mind, to entertain for a moment the arguments of some. Surely preparedness can have no bad effect, even if our services are never needed. Preparedness of the young man, or the training that he derives through military tactics, is of great benefit. It teaches him discipline, it teaches him the fear of God, it teaches him how to take care of himself, it teaches how to take care of his fellow man in an emergency, and if the occasion never arose wherein he might be called upon to sacrifice his life, nothing but benefit could be derived anyhow.

LESSONS FROM ADVERTISING

While our profession does not believe in advertising, nevertheless some things can be learned from advertising. I do not mean the advertising of the black sheep in our profession, but the advertising of other concerns. I happened to run across one advertisement that appealed to me, and I wish to read it, simply paraphrasing parts and changing a few words here and there. It is under the title of "Protect Our Good Name." All of you have a Good Name to protect, not only your individual name, but the Good Name of our Profession. Every one of you, through some little misstep, may throw a cloud over the good name of your colleagues in the profession. With that in mind, I would like to read this:

"Stripped to the waist, the huge torso streaming with sweat, a workman flings the heavy iron core to an iron table, and wrenches off his product which has just come steaming from the heater. His eyes fall on the legend over his head, and smiles. This legend is, 'Protect Our Good Name,' " (which is a motto apparently scattered all around through the workshops and offices of this concern). Our good name is also his good name. The two are interwoven. He will protect the one while he subserves the other. His thoughts are, as they should be, chiefly for himself, of his little home and of his family. Their good name, his good name, our good name. His good work will stand guard over them all. Two thousand miles away, in Seattle, we will say the same thought in the same simple words."

Apply that locally, not to Indianapolis, but perhaps to Evansville, or to Ft. Wayne, or some other corner of our territory. "An irritating moment has arrived," (and we have lots of them, the temptation to speak sharply to a patient, we will say; to fling a slur at unworthy competition; the dentist, or his superior in the office possibly) or whosoever it may be, looks up, and the quiet admonition in his eye "Protect our good name." "In a twinkling it smooths the wrinkles out of his point of view. He is himself again, a man with a responsibility which he could not escape if he would, and would not if he could. Back two thousand miles again," (we will say back to Indianapolis, although it is only a hundred miles this time,) "to the experimental room," (simply another department in our profession,) "and we will say a chance to save, to make more profit by scheming, by substitution. No one will ever know. But the silent monitor repeats its impressive admonition, 'Protect our good name.' What chance to compromise with conscience in the presence of that vigilant guardian! Thousands of men striving to keep a name clean, and keeping their own clean in the process."

"We Americans, it is said, make a god out of business. Let the slur stand. Whether it be true or not, it is true that business is our very life. Shall it be a reproach to us if we try to make business as good as it can be made? Think of this business, please, in the light of its great animating thought, 'Protect our good name.' We are thinking of you always when we say it, you American millions, and you millions in the old world. We think of you judging us by what we are, by what we do, by what we make. We think of tens of thousands of homes in which our name can be made to stand for that which is worthy and worth while. We must not lose your good will. We must not tarnish our good name. We can call that anything you like. You can call it business or sentiment or idealism or nonsense. It may be all of these; it may even be that which our national critics call making a god out of business, but it gives to us a motive that is bigger and broader and better than money. It makes thousands of men happier in their work and more faithful to it. It has made this business a democracy of united thought, a democracy of common endeavor, a democracy of purpose and principle, and here is the oddest thing of all, the more we live up to this practical ideal, the greater the business grows; the more we labor for the future, the more the reward in money; the more we put into our product, the more we take out in saving. Perhaps, after all, there is more than one sense in which it is good to make a god out of business. We think so, and we think you think so."

I desire to thank the members of the State Association for the honor that they leave conferred upon me in making me their president. It is not without responsibility, and I trust the duties of the office have been executed as they should have been, and that our conduct may be a credit to our profession in the state. I desire at this time also to thank the most efficient chairman of the Executive Committee, our Secretary, our Clinic Supervisor, our Exhibit Supervisor, and every chairman of committees who has put forth efforts to make this meeting a success. I believe that all of us know that a great deal of responsibility rests upon the individual shoulders of these men. Without their loyal support, I could have done nothing and I would not for one minute have you feel that I would take the credit that belongs to them. I thank you.

Crown and Bridge Work on a Physiologic Basis

I affirm the principle that teeth move in function.

That their mobility is essential to the maintenance of a physiologic equilibrium by virtue of inducing a constantly active circulation.

That different teeth sustain different stresses and move in different directions.

That teeth used as abutments for bridges must be allowed to retain their individual tooth motion.

That artificial restorations, known as bridges, must move to a limited extent with the underlying mucosa.

That these restorations must move in the same directions and to the same limited extent in which and to which the natural teeth moved when they were in proper place.

That parallel abutments and attachments are absolutely essential for correct bridge restorations.

That it is nothing short of criminal to destroy a pulp in a tooth not involved by decay in fairly normal position and distally to the cuspid.

That the destruction of such teeth is unnecessary in order to make them available for bridge abutments.

The uselessness of clasps, the folly of buttons, the unreliability of universal joints, the crudeness of split bars, and the malicious influence all the foregoing have upon the human organism.

The correctness of applying geometric principles obtaining the necessary limited mobility in bucco-lingual and linguo-buccal directions

I affirm the necessity of dissipating by the above means the stress upon a ridge before the elastic limit of the underlying tissue has been reached.

—Dr. H. E. Chayes, *Journal Allied Dental Societies.*

EDITORIAL

A MEMORIAL TO DR. G. V. BLACK

At the recent meeting of the National Dental Association, a committee was appointed to arrange for a suitable memorial to be erected to Dr. G. V. Black, in commemoration of his signal service to the dental profession and to humanity.

Similar action was previously taken at a meeting of the Illinois State Dental Society, and a committee of five Chicago men was appointed as follows: W. H. G. Logan, chairman, Dr. C. N. Johnson, Dr. T. L. Gilmer, Dr. F. B. Moorehead and Dr. E. K. Blair. At the National meeting the same committee was appointed, and the members are now soliciting funds from members of the profession for this worthy cause.

In the circular letter sent to members of the National Dental Association we read:

"The name of G. V. Black must ever remain synonomous with all that is scientific and progressive in dentistry and his profession will do itself honor in honoring his memory. Believing every dentist will feel it a personal privilege to assist in the movement, this appeal for a contribution of either two or three dollars is made to every member of the National Dental Association. The amount requested is made small purposely, so that every dentist may be represented by a small sum rather than a few with large sums. Of course, those who were great admirers or personal friends of Dr. Black will want to contribute more, and for this the committee will be grateful."

It is needless for us to attempt to tell our readers what this great man and scientist did for the dental profession, for everyone already knows. And besides, we would have to write a book to include all that he did for dentistry.

No dentist who has his profession at heart should hesitate to comply with the request. The response should be spontaneous. The amount asked is so small that no dentist will miss it. The memorial will not only show the world the appreciation dentists had for this dental scientist, but it will have an influence on our rising generations to not be content with the superficial in dentistry, but to strive for deeper knowledge and help solve the many things that are yet unknown. Send your contribution today to Dr. W. H. G. Logan, 29 East Madison St., Chicago, Ill.

A BANQUET FOR MR. THOMAS FORSYTH

On January 20, 1917, the dental profession of the United States will tender a banquet to Mr. Thomas Forsyth, who made the Forsyth Dental Infirmary a possibility.

All honor is due a man who is philanthropic enough to build such an institution for the benefit of humanity.

At this banquet a silver loving cup, a symbol of affection of the dental profession, will be given to Mr. Forsyth.

It is desired that there be a large attendance at the banquet, and all those who can attend should do so. In another column we publish an invitation from the banquet committee and we ask you to turn to that page and read it for it is addressed to you.

PROMOTIONS AMONG ARMY DENTAL SURGEONS

By order of the War Department, October 4, 1916, the following named first lieutenants, dental surgeons, were asked to report by letter to Major James D. Fife, Medical Corps, president of the examining board at Fort Sam Houston, Texas, appointed in paragraph 38, Special Orders, No. 232, War Department, October 4, 1916, for examination to determine their fitness for promotions:

Robert T. Oliver, S. Davis Boak, Clarence E. Lauderdale, Franklin F. Wing, George L. Mason, Frank H. Wolvern, John H. Hess, Hugh G. Voorhies, William H. Chambers, Alden Carpenter, Edwin P. Tignor, John A. McAlister, Jr., George H. Casaday, Julin R. Bernheim, Rex H. Rhodes, George E. Stallman, George I. Gunckel, Frank P. Stone, Raymond E. Ingalls, Harold O. Scott, John R. Ames.

The above twenty-one Army Dental Surgeons who were ordered up for examination, are those that have had over eight years' necessary service to promote them to the rank of captains in the dental corps under the Defense Act. None are eligible to be promoted to majors, as the law requires twenty-four years' service before promotion, and the older men of the corps have only had sixteen years' service. These promotions are the first to be made under the three grade bill, secured last session of Congress.

The following dental surgeons have been appointed in the National Guard, under the provisions of the National Defense Act, June 3, 1916:

Louisiana

First Lieutenant, Walter C. Hava, La. Infantry, Brownesville Texas.

Kentucky

First Lieutenant, Ura M. Bryant, Island, Kentucky.
First Lieutenant, Omar S. Meredith, Leitchfield, Kentucky.
First Lieutenant, Hubert E. Royalty, Haedinsburg, Kentucky
Present address of Kentucky men is Fort Bliss, Texas.

Ohio

First Lieutenant, Lester F. Kishler, 304 W. Tiffin St., Fostoria, Ohio.
First Lieutenant, Paul J. Aufderheide, 4255 E. 96th St., Cleveland, O.
First Lieutenant, Earl J. Swan, P. O. Box 486, Lima, Ohio.
First Lieutenant, John A. Sites, 626 Washington Ave., Defiance, Ohio.
First Lieutenant, Ralph R. Parker, Lock Box 84, Burton, Ohio.

First Lieutenant, Carl E. Bobo, 941 Hunter St., Columbus, Ohio.
Present address, headquarters of Ohio troops, El paso, Texas.

Indiana

First Lieutenant, John E. Shill, Winnemac, Indiana.
First Lieutenant, R. F. Ross, Bloomington, Indiana.
First Lieutenant, John W. Puffer, Indianapolis, Indiana.
Address care of 1st Ind. Brigade, Llano Grande, Texas.

West Virginia

First Lieutenant, Thomas E. Wright,
2d. W. Va. Infantry, Fort Sam Houston, Texas.

As the National Guard receiving Federal support must conform to the organization of the Regular Army, which authorizes one dental surgeon for every 1,000 enlisted men of the line of the Army, the Militia is entitled to the same proportion.

Dentists can be appointed in their State National Guard under the following conditions and requirements: Must be a citizen of the United States or have declared his intention of becoming one; must be between the ages of 21 and 35; must have a satisfactory general education; must be a graduate of a reputable dental school legally authorized to confer the degree of doctor of dental surgery; must be a legally qualified practitioner of dentistry in the state, and must have at least one years' experience in the practice of his profession. A dental surgeon on the active list of the National Guard receives $250 per year, except when in the Federal service, when he receives the same pay and allowances as an officer in the Regular Army of like grade. He enters the National Guard as a First Lieutenant, and after serving eight years can be promoted to the grade of captain. Appointments are made by the Governor of each state, territory and District of Columbia, subject to such tests of moral, physical and professional fitness under such rules and regulations as the Secretary of War may prescribe.

The following sixteen dental surgeons who qualified in the Army examinations of last July have been commissioned Dental Surgeons with the rank of first Lieutenants. These men are the first to be commissioned under the Defense Act of June 3, who have not had to serve as contract dental surgeons. The contract status having been abolished by this act.

Harry E. Valentine, Baltimore, Md., Thomas L. Smith, Red Level, Ala., Earl T. Dickman, St. Louis, Mo., Walter G. Smith, Oakland, Cal., Chas. M. Taylor, Vancouver, Wash., Brantley J. Newson, Salisbury, N. C., Aron F. Eidemiller, Piqua, Ohio, Elbert E. Rushing, Pike Road, Ala., George B. Tressel, Ada, Ohio, Oscar P. Snyder, Orrville, Ohio, Howard J. Benedict, Alexandria, Tenn., Fred H. Bockhoven, Newark, Ohio, Lee B. Schrader, Shelbyville, Ind., Rex M. McDowell, Orrville, Ohio, Joseph H. Tyler, Johnstown, Ohio, William Mann, Morehead, Ky.

SOCIETY ANNOUNCEMENTS

Come to Boston

Gentlemen of the Dental Profession: An opportunity of tremendous importance is at hand your manly appreciation and your loyalty to dental principle are now to be tested.

On January 20, 1917, you will have an opportunity to give further proof of your devotedness to your profession, not merely as individuals, but collectively as a great host. On that evening a banquet is to be held in Boston. At this banquet there will be presented a silver loving cup, the symbol of the affection of the dental profession. This cup will be presented at this banquet to the distinguished gentleman who has given to dentistry the most priceless treasure of its history—to Mr. Thomas Forsyth.

Thomas Forsyth has as yet received no honorary degree. No college or university has in any way shown its appreciation of his contribution to the cause of humanity; and it is better so. For their negligence has given to us, members of the dental profession, the privilege of being the first to publicly honor the man to whom we owe the first and greatest institution of its kind in the world. Each of you is expected, therefore, to do his utmost to swell the numbers over one thousand strong who will gather in Boston on the evening of January 20, to testify by their presence to the esteem and gratitude which they feel for Thomas Forsyth.

This occasion should be an epoch in our lives never before in the history of our profession have we been so indebted to anyone— never before, then, has it been so imperative that we acknowledge by our presence, as a professional body, our appreciative indebtedness to this benefactor of humanity.

And wherein is he our benefactor? Thomas Forsyth has given to God's children an institution which will free them from one of the greatest tortures of childhood. Who has read of his aim to establish a dental clinic for indigent children without a thrill of social pride?

The Forsyth Dental Infirmary is no longer an aim, a theory: it is a fact. Hundreds of suffering children are relieved daily from pain, and hundreds of grateful patients are bestowing earnest blessings upon the man who made this possible.

Shall we of the dental profession be less grateful? Shall we who realize the enormous importance of such an institution, who have been begging for it for a generation, shall we fail to give thanks?

Come then, to Boston, January 20, 1917, and show by your spontaneous response to this general invitation that every man of you, as individuals and members of a great collective body, are proud and glad of the opportunity to honor Mr. Thomas Forsyth, of Boston.

BANQUET COMMITTEE ON PUBLICITY,
FREDERICK A. KEYES, D.M.D., *Chairman.*
PERRY R. HOWE, D.M.D.
H. S. BELYEA, D.M.D.

The Preparedness League of American Dentists

This league is meeting with great success. Study units, in conformity with Army requirements, are being established in principal cities. Its purpose is to prepare Dental Surgeons for Army service in time of need. This organization has the hearty support of the Government and much beneficial legislature governing the Army Dentist is sure to result.

This organization policy appeals to all patriotic dentists and at the present time, in case of war, we could place at the disposal of the Government the best men in the profession. If you have not joined, do so at once, for you cannot afford to be quiet on this subject.

The private is called to a life of great sacrifice in time of war, and the Army Dental Surgeon is needed to help keep these men in shape and to look after them when wounded. Our place is to be ready when our country calls, whether in times of peace or war.

J. W. BEACH, *Chairman,*
Buffalo, N. Y.

Arkansas Examination

The Arkansas State Board of Dental Examiners will hold a special examination at the Marion Hotel in Little Rock, Arkansas, on Thursday, Friday and Saturday, January 4, 5, and 6, 1917.

Examination written and practical. Application and fee should be filed at once so that we may make arrangements for all who wish to be examined.

For further information, write

DR. I. M. STERNBERG, *Secretary,*
Fort Smith, Ark.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

Don't tell all you know, but know all you tell.

Many a man's hobby is merely a clotheshorse.

Many of the plums of life prove to be prunes when you bite into them.

The anvil chorus doesn't turn out any horseshoes—nor four-leaf clovers.

Many a man has made a false step by standing still. —*From Various Sources, revised.*

We should not attempt to do anything into which we cannot put our whole hearts. We have certain work to do for bread, and that has to be done strenuously; other work to do for our delight, and that has to be done heartily; neither is to be done by halves or shifts, but with a will; and what is not worth this effort, is best not done at all.

—*Ruskin, revised.*

Isn't it a pleasure to stand in one's place and see other men grow and grow? It greatly resembles a well-executed and well-displayed screen at the movies. And there are men in the dental profession who are growing so fast that we all need to hustle to keep even in sight of them. By the way, have any of you sized up Dr. Otto U. King lately?

It is of no use to throw sunlight into the eyes of the blind.

Men who have no truth in them need not be expected to recognize truth when they meet it in the road.

One single, stubbornly ignorant man can bar the progress of a hundred intelligent men—for a while; but in the end he is swept away and forgotten.

In leasing a house or flat, see that the lease does not bind the landlord to furnish heat during "the winter months" only. In law and astronomy, winter, north of the equator, begins December 21 and ends about March 21. Leases should read, say, "from October 1 to May 1."

Don't allow your office or reception-room to become cluttered up with a lot of old truck that has no useful or decorative value. Be as old-fogy as you like inside, but see that your surroundings present an up-to-date appearance.

If you don't own a good barometer, buy one. While its predictions may not be dependable to the hour, it will help you to plan your days as nothing else can.

The man who spends much of his time looking for the easiest way of doing things, isn't likely to stumble on the right way more than once or twice in a dog's age; but the man who looks for the best way is sure to find it soon or late.

Holding back your endorsement of and help in a good movement until you see which way the wind of popularity blows, reminds me of a farmer who would wait until after "it rains" before sowing his seed.

We don't think much of the dentist who advertises cut prices; but do we patronize merchants who do the same thing? Merchants who advertise and sell standard goods at fixed prices are public benefactors; those who cut the prices of such articles are public nuisances. It is all very well to insist upon "ethics" within your own profession, but what about the broader field of ethics in the world outside? You want the price-cutting and cut-price-advertising dentist left strictly alone; why not practice what you preach before a little wider audience?

Really, competition is no longer so much a matter of price as a matter of brains. You know that the dentist who uses brains, plus energy, plus system, to keep things moving is seldom idle, and he usually rides to his office in a six.

It is just as well that few women have a sense of humor; otherwise, most of them would laugh at the men instead of worshiping them.

I sometimes wonder how some women manage to get husbands—until I see the husbands. Then I wonder how the men managed to get wives.

"Laugh and the world laughs with you; weep, and you weep alone." Laugh at the world and it will kiss your feet. And, really, there is so much to laugh at in this crazy old world that no man has a legitimate excuse to nurse a grouch.

The successful man is made, not born; and all the average man needs to reach a satisfactory degree of success is just a little of that old bull-dog, persistency; hang on and dig.

Even the Wall Street Journal can now find some good in the re-election of President Wilson.

Woman s influence had a lot to do with the late election. For instance, the visit of that million-dollar train, loaded with diamonds and frumps, had a lot to do with the loss of Ohio to Mr. Hughes. A man with a bag of Mail Pouch and fifteen cents for his lunch in his pocket, is not likely to take kindly political advice offered to him by a woman wearing enough silks and jewels to feed his family for a year. Then, of course, only about one woman in ten wants to vote, or would vote if she had the opportunity; and the influence of these womens exercised in the good, old womanly way, still goes a lot further than feminine blatancy dispensed at the tail of a Pullman train.

Dentists should be neither tooth-pullers nor tooth-fillers, but tooth-preservers and health-preservers. Compared with another profession that I might name but shall not, they always have been life-preservers.

It can be done! A dental friend of mine sat in my office one day last week and told a wonderful story of twenty-two years' practice in the same town with just $19.73 book accounts, and every penny of that so good that he would not take $19.74 for it. What do the woeful wailers think of such a record—those who skirmish around all Saturday afternoons trying to gather in enough for the collection-plate next day?

If the present rate of German success in the Balkans keeps up, the last trip of the Antwerp-to-Constantinople express, at no distant day, will have an august passenger in the person of Mackinsen; who, by the way, is said to be a renegade Scott—though I doubt it.

There are twenty-four hours in every day. Twenty-three of them I am willing that you should use for yourself and your family; but the other one you owe to the profession of dentistry as a whole—to humanity, in other words; and if I can persuade every one of you to devote that one hour every day, the profession will be revolutionized in a year.

The only money you *really* make is the money you have left at the end of the year. How much did you earn last year? How much did you collect? How much have you now? All of these questions and a hundred others can be answered in a minute if you are using the Dental Accounting System introduced last year. If you have not begun using it—now is the accepted time, now is the day of salvation. Selah!

Every man is made of three H's—Heart, Head and Hand. Unless a man is educated—developed—in each about equally, he will be a misfit in the world. Ethics govern the heart, intellect the head, and skill the hand. If head and hand are educated at the expense of the heart, we have the intellectual barbarian, no more, no less; the thinking machine.

Another new tooth-brush. This time it is in the form of a brush-wheel, revolved by a worm-gear in the handle. Doesn't look like a tooth-saver to me.

Anyhow, the dentist never says to a patient: "Shampoo, sir;" "Shine, sir?"

Many arrests of illegal practitioners, result of campaign in Chicago. The Tribune is backing up the authorities.

Well, the M. E. D. A. convention has come and gone, and the sun still shines. But, if the small ripple apparent on the surface of things were to be regarded by the "regulars" as all there is to the movement, a great mistake would be made that somebody would need to pay for later on.

Notice what is being done over in Indianapolis? There's going to be less catch-penny dental advertising in that burg from this time forth and forever. Remember the old saying: A lie may travel a hundred leagues while truth is getting its boots on; but truth travels a hundred leagues at a step.

Poverty and failure are as much the result of violation of law as is physical illness. Nobody ever has been able to make me consider success a crime nor a clean shirt the mark of the felon.

The exhibit of the Dental Manufacturers' Club at Philadelphia, during the last days of October and first of November, was a mammoth affair that called out a fair attendance of dentists in that section. The displays were creditable and ably handled.

The Ransom & Randolph Co. announces the removal of its Columbus house into more commodious quarters in the Wheeler block, No. 5 West Broad, just twenty-five feet off High street, within sight of the Capitol. Open house was held in the new location November 23, which was largely attended by dentists throughout the territory covered by that branch.

The new Columbia University dental school is to have an endowment of one million dollars, a large part of which already has been secured. Its students are all to be two-year graduates of the College of Physicians and Surgeons, two years more to be spent in dentistry, making it the only graduate school in America.

Defective teeth caused 6,000 failures in Kansas City schools last year.

Once more: THE DENTAL SUMMARY is prepared to supply manuscript lectures for delivery before schools, mothers' clubs, and similar organizations, to all who apply, free of all cost. It also is prepared to supply slides, plain and colored, either by sale or on rental. Write to this magazine when you are ready to do something for dentistry.

Authorities state that bad teeth cost the people of Kansas City $240,000 last year in additional charge for public schools. Seems to me it would be much cheaper to establish clinics and care for all children free of charge.

Dr. Harvey W. Wiley says that the deaths of one thousand children every day in this country can, in large part, be charged to bad teeth. Ask your lay neighbor how much this loss costs this country every day.

So far as reported, only 27% of our school children ever use a tooth-brush; that is, with any degree of regularity, while 15% never have used one.

Sixty clippings in one month from the lay press certainly would seem to indicate a degree of interest in things dental, quite unheard of only a few years since.

If *you* haven't already made up your mind to go to Dayton next week, do it right now, and make arrangements accordingly The big Ohio meeting is going to be bigger than ever this year, and you are wanted.

Dr. R. M. Sterrett, many years associated with the advertising of Antiphlogistine, sends greeting to his many friends, announcing his resignation as advertising manager of the Denver Chemical Mfg. Co., effective January 1.

Dr. G. H. Hale, Bloomingdale, Mich., desires the name and address of any and all dentists who have practiced for fifty years or over. He desires to form a Half Century Club. Write Dr. Hale at once.

LISTERINE

is an unirritating, non-caustic antiseptic solution, well adapted to many requirements in **Dental Practice.** It is the strongest and safest of the antiseptics available for daily use as a wash for the mouth and teeth.

LISTERINE

being slightly acid, is most valuable and effective in preventing the multiplication of various micro-organisms which thrive in the normally alkaline saliva of the mouth.

LISTERINE

because of its slight acidity and aromatic flavor, stimulates the flow of saliva and thereby assists in maintaining a healthy equilibrium of the fluids of the oral cavity.

"The Dentist's Patient" is a booklet designed to impart useful information to the patient regarding the teeth and their care, and advocates frequent visits to the dentist's office. We publish and deliver these booklets free of cost in lots not exceeding 200 copies, imprinted with the dentist's name and address when desired.

LAMBERT PHARMACAL COMPANY
TWENTY-FIRST AND LOCUST STREETS, ST. LOUIS, MO.

Illinois-Northern

Aurora, Ill , Oct 20—The convention of the Northern Illinois district was the most interesting ever held The next meeting will be held in Dixon The following officers were elected for the coming year: President, B. H. Biglow, rockford; vice-president, W. E. Tucker, Lena; secretary, C. L. Smith, St. Charles; treasurer, Edmund Noyes, Chicago; chairman program committee, H. F. Lotz, Joilet; chairman clinic committee, F. F. Molt, Chicago; chairman local committee, W. C. McWethy, Dixon.

Passed

The following graduates passed the Ohio Board at its last meeting: Angus S. Adams, Northwestern Dental College; Raymond P. Hock, Ohio College of Dental Surgery; Harry L. Jones, Western Reserve; J. W. Stapleton, Ohio College of Dental Surgery; F D. Mehling, Louisville Dental College; Oliver L. Herke, Western Reserve; Jurien Hoek, Western Reserve; H. I. McLaughlin, Western Reserve; W. H. Green, Western Reserve; W. H. Shea, Ohio State University Dental College; Frank H. Happy, Vanderbilt University; H. L. Junkerman, Cincinnati Dental College; G. H. Lampe, Ohio College of Dental Surgery.

DEATHS

On October 25, a chapel service in memory of Dr. C. R. E. Koch, for thirteen years secretary Northwestern Dental School, was held at the University building, Chicago, at which Dean Gilder presided. Many prominent educators took part.

Near Virginia, Minn., October 30, Dr. J. A. Latdetti, of Cook, Minn., was found dead, presumably of heart affection.

At New Bedford, Mass, October 20, Dr. Joseph Christie, aged 43.

At London, Eng., October 28, Dr. Bentley J. Bonnell, an American dentist, aged 70. Dr. Bonnell began practicing in London in 1876.

At Brooklyn, N. Y., November 6, S. N. Lyon, aged 73.

At St. Paul, Minn., October 20, Dr. Arthur J. Thompson, aged 67. Dr. Thompson was considered an authority on the dental subjects upon which he specialized.

At Detroit, Mich., October 29, Dr. George Lindsey Field, from injuries received when struck by a street car. He had practiced in Detroit for more than fifty years, and for ten years had been dean of the dental department Detroit College of Medicine

ROBBERIES

Dental offices in Moline and Rock Island, Ill., and Davenport, Ia., were cleaned up to the tune of about $1,000, October 22.

Savanna, Ill., also had a touch of "that fine Italian hand "

Dr J A Gordon, Helena, Mont, mourns the loss of about $200

Springfield, Ill , closes the list this month with $150, divided between five dentists

Office of Dr. A. H. Gunther, Chillicothe, Ohio, Nov. 12, $100.

—All of which suggests the thought that society is very much of oyster, which the smart thief opens at will Only the bunglers are caught, and but few of them Ususally, thirty-five to forty men, and six to ten days' time are required to catch and convict a single malefactor; and, during that process, a hundred other crimes usually are committed

The Optimist—Does This Mean You?

BY MILTON RUGGLES

Full-gifted with power to see and understand,
Product of ambition, noblest of the land,
Believing in the future—in the present, too—
This is the optimist—does this mean you?

Pure-hearted, with strength to fight and win,
Guided by a purpose—not what might have been,
Aiming at the greatest, nothing less will do—
This is the optimist—does this mean you?

Unmindful of the failures, looking straight ahead,
Outliving disappointment—profiting instead,
Rising above discouragement, beginning life anew
This is the optimist—does this mean you?

Classified

Advertisements under this heading, $2.00 each for 60 words or less, additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

FOR SALE—In a south central Ohio town of 6,000—surrounded by ten towns with populations ranging from 200 to 1200, in which there are no dentists. There are but three dentists. One is leaving to engage in a special line of work. Office fully equipped. Established eight years. Must be sold by first of the year. Price very reasonable. Address: 1220P care of The Dental Summary.

WANTED—At once in Ethical Office, middle-aged man of average ability, licensed in Indiana. Mostly operating. Good opportunity for some one who lacks the business ability to make his own business a success. Good health required. Can assure congenial surroundings and fair compensation. Address, 1240P care of The Dental Summary.

FOR SALE—A leading Detroit dentist's equipment and practice. Office equipment complete and up-to-date. Fine office. Large high-class practice. Office rent $32.50. Reason for selling, ill health. Will sacrifice for $1,000.00. Apply R. E. Watkins, 261 Woodward Ave., Detroit Mich. 1260P

FOR SALE—Practice, $3,500. Good equipment invoicing $800, in town of 600, in south central Ohio; excellent farming community. No competition. Price very reasonable to right man. Address 1210C, The Dental Summary.

WANTED—AT ONCE—Good general laboratory man; must be able to do better than average work anywhere he is put. We operate four high-grade laboratories and can give permanent employment to right man. Address, giving age, experience, wages and references in first letter, F. W. 1200, care of The Dental Summary.

DENTIST WANTED—Fine location for a good man, in Michigan resort town; permanent population 1,000; summer population 5,000; no dentist; two physicians doing well. Two fine connecting rooms, just the place for dental office; wired for electricity, piped for gas; toilet and lavatory; furnace heat supplied. Rent, including heat, $12.00 per month. House rent is $10. to $15. per month. Most houses have all modern conveniences. Here is an opportunity that doesn't come often. Answer at once. Somebody is going to do well here. Address 1250, care of The Dental Summary.

THEY "EXTRACT WITHOUT PAIN." TEN WHOLESOME, HUMAN COLLECTION LETTERS $1.00. REFUNDED IF DISSATISFIED. WILLIAM COOK, 80 MAIDEN LANE, NEW YORK. 1230F